



PASTORAL
LAND BOARD

NORTHERN TERRITORY

ANNUAL REPORT 2021



LETTER OF TRANSMITTAL

Hon Lauren Moss MLA
Minister for Environment, Climate Change and Water Security
Parliament House
GPO Box 3146
DARWIN NT 0801

Dear Minister

In accordance with section 29(a) of the Pastoral Land Act 1992, I hereby submit for you information and presentation to Parliament, the Pastoral Land Board Annual Report on the land condition of the NT Pastoral Estate for the period 1 January to 31 December 2021.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Julie Ross', with a stylized flourish at the end.

Julie Ross
Chairperson

EXECUTIVE SUMMARY

The Board is a statutory authority under the *Pastoral Land Act 1992*, made up of at least five members, including a Chairperson, appointed by the Minister for Environment, Climate Change and Water Security. It reports annually to the Minister on the NT Pastoral Estate, which is held over 224 pastoral leases in eleven pastoral districts.

This Annual Report covers a period of 12 months from 1 January to 31 December 2021. To make this Annual Report, on-ground field data, remote sensing satellite monitoring and first-hand accounts from land managers are compiled to make an assessment of the land condition at the property, district and regional scales.

Total rainfall in 2021 was average to above average for the eleven pastoral districts. The decile ranked total vegetation cover for late 2021 showed that general vegetation cover correlated with the rainfall pattern with average to well-above average cover in the Katherine, Darwin, Roper, Gulf, Sturt Plateau, VRD and Northern Alice Springs Pastoral Districts. The Southern Alice Springs Pastoral District also experienced above average rainfall. However, vegetation cover was more variable, ranging from the lowest to well-above average vegetation cover when compared to the long-term baseline. The same variability range in vegetation cover was also observed for the Barkly, Plenty and Tennant Creek Pastoral Districts, which experienced average rainfall.

Fires affected areas in the Darwin, VRD and Roper Pastoral Districts in 2021. However, much of the widespread and intensive fire activity was not recorded on the pastoral leases in these pastoral districts. Fire in the northern pastoral districts in April and May reflected managed early dry season burns.

On-ground monitoring was undertaken at 327 sites on 46 pastoral leases in ten pastoral districts; 14 sites were assessed as Excellent, 83 as Good, 180 as Fair and 50 as Poor condition. One lease had an overall land condition rating of Poor, with all other leases rated Good or Fair.

This Annual Report includes a trend analyses on whether the overall land condition rating of a pastoral lease in a pastoral district had changed since it was visited previously. The land condition rating of 40 pastoral leases improved, did not change or transitioned to a single rating (i.e. Good/Fair to Fair). Pastoral leases in the Northern and Southern Alice Springs Pastoral Districts exhibited the most improved ratings. Responsive herd management, practices to encourage prolonged water holding capacity and efficient feral and weed management were cited as positive and effectual land management practices implemented by Centralian Australian land managers.

The land condition rating of the only two pastoral leases monitored in the Barkly Pastoral District in 2021 declined from Good to Fair and the other from Good/Fair to Poor. Four pastoral leases, comprising the VRD (pastoral lease 2 and 4), Gulf (pastoral lease 1) and Sturt Plateau (pastoral lease 1) also declined from Good to Fair. When the leases were inspected, it followed either poor rainfall and/or extensive fire and each of the leases showed signs of recovery. The single pastoral lease rating that declined to Poor exhibited a general decrease in desirable perennial grass cover that was replaced by less desirable annual grasses. A lack of adequate weed and erosion control combined with smaller paddock rotations have likely contributed to the Poor condition rating and the land manager will need to implement active recovery measures.

The results from targeted monitoring sites supported the land condition modelling results, and this report is considered to be representative of the inspected leases.

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CHAIRPERSON'S FOREWORD



I am pleased to present the 2021 Annual Report of the Pastoral Land Board.

For the first time, this Annual Report has used the calendar year for the reporting period from 1 January to 31 December 2021 and includes a new section on land condition trends from the on-ground site inspections over time. The Board's integrated monitoring program has been in place since 2013 and most pastoral leases have been monitored at least twice using this method. The Board has used this information to present a snapshot of whether the overall land condition of a pastoral lease in a pastoral district has changed since it was visited previously. As more leases are visited and more robust data are collected through the rangelands monitoring program in years to come, the Board considers the inclusion of trend analyses a valuable new addition to its Annual Reports.

In 2021, the Board focused on efficient and outcome-driven administration. It released contemporary Pastoral Land Clearing Guidelines, which included a stand-alone schedule to complement the release of the Northern Territory Government's *Simplified Pastoral Land Clearing Applications Policy* to assist applicants to prepare applications made under this policy. The Guidelines also refer to the web-based pastoral notices portal that was launched in June 2021 to help the public view and make submissions on pastoral applications.

The Board also commenced consultation on the draft Compliance Framework, which has been prepared by the Board to ensure administration of statute is managed in a consistent, proportionate, timely, transparent and accountable manner.

The easing of travel restrictions allowed my Board to hold in-person meetings in Darwin, Katherine and Alice Springs and visit stations in the Katherine, Roper and Southern Alice Spring Pastoral Districts. Uncharacteristic and welcomed rainfall in March 2021 prevented the Board from visiting pastoral leases in the Northern Alice Springs Pastoral District, which it will endeavour to visit soon. The Board appreciated and immensely enjoyed these visits and learning about emerging industries and land management practices. Thank you to those who took the time to host the Board to share ideas, stories and bottomless cups of tea.

I conclude by thanking my fellow Board members, the Rangelands Division staff for providing technical and administrative support to the Board, and the pastoralists who participated in the 2021 rangelands monitoring program. Thank you for all the hard work and dedication.

Julie Ross

MEMBERSHIP

CHAIRPERSON



Ms Julie Ross

Commenced with the Board on:
22 November 2019

MEMBERS



Dr Leigh Hunt

Commenced with the Board on:
28 September 2015



Mr Alastair Shields

Commenced with the Board on:
19 June 2019



Mr Steven Craig

Commenced with the Board on:
25 June 2002



Mr Roy Chisholm

Commenced with the Board on:
28 August 2019



Mr David James

Commenced with the Board on:
28 September 2015

EXECUTIVE OFFICER

- Ms Tammy Smart

FUNCTIONS OF THE BOARD

Section 29 of the *Pastoral Land Act 1992* outlines the function of the Board are:

- a. to report regularly to, and as directed by, the Minister, but in any case not less than once a year, on the general condition of pastoral land and the operations of the Board
- b. to consider applications for the subdivision or consolidation of pastoral land and make recommendations to the Minister in relation to them
- c. to plan, establish, operate and maintain systems for monitoring the condition and use of pastoral land on a District or other basis
- d. to assess the suitability of proposed new pastoral leases over vacant Crown land
- e. to direct the preparation, and monitor the implementation, of remedial plans
- f. to monitor, supervise or cause to be carried out work in relation to the rectification of degradation or other damage to pastoral land
- g. to monitor the numbers and effect of stock and feral and other animals on pastoral land
- h. to monitor and administer the conditions to which pastoral leases are subject
- ha. to consider and determine applications for permission to use pastoral land for a non-pastoral purpose in accordance with Part 7
- j. to make recommendations to the Minister on any matter relating to the administration of this Act
- k. to hear and determine all questions, and consider and make recommendations on all matters, referred to it by the Minister
- m. such other functions as are imposed on it by or under this or any other Act or as directed by the Minister.

Other functions outlined in the Act include:

- to determine applications for clearing pastoral land
- to determine applications for non-pastoral use of pastoral land
- to consider breaches of conditions referred by the Minister
- to consider and make recommendations to the Minister on applications for conversion of term pastoral leases to perpetual tenure
- to consider and make recommendations to the Minister on applications for consent to transfer a pastoral lease or sub-lease should the advice of the Board be sought
- to administer the access provisions of the Act, including nomination of access routes under Part 6.

LAND CONDITION

Land condition is an assessment of vegetation and soil health as indicated by ground cover species composition, tree and shrub density, abundance of invading plants (native and exotic), soil surface condition and soil erosion. These attributes are assessed relative to land in near-pristine condition.

The main influences on land condition are rainfall, grazing by domestic, native and feral grazers and fire. Grazing is managed by manipulating stocking rate, stock water distribution, feral grazing control and fire. Fire on its own can change land condition by being too frequent or too infrequent over a long period of time, but its main effect on land condition is through changing the distribution of grazing as grazers prefer younger grass.

Remedial plans to address land condition issues

In cases where land condition issues are identified on a pastoral property, the Board may request the lessee to prepare and submit a voluntary remedial plan detailing actions to be taken to address the land management issues. It is the expectation that pastoral lessees acknowledge their duty to adopt sound management practices and their responsibility to address any land condition issues that may arise. In line with this philosophy, the Board seeks voluntary collaboration with pastoral lessees to address land condition issues.

While voluntary management plans are preferred in the first instance, if the Board is of the opinion that where pastoral land has been degraded or otherwise damaged it may require a remedial management plan detailing the proposed management of the pastoral land over a specified period of time. Remedial plans need to be endorsed by the Board and are registered on the title. There are currently no remedial plans in place.

PASTORAL LAND MONITORING PROGRAM

The Department of Environment, Parks and Water Security assesses and monitors land condition for the Pastoral Land Board.

Integrated monitoring program

The integrated monitoring program was introduced in 2013 to provide objective, whole of landscape reporting of changes in land cover. It comprises a network of ground-based sites, incorporating the existing Tier 1 sites, where suitable, with newly established sites appropriate to validate and inform satellite data and products.

New sites are established at or near existing Tier 1 sites to maintain consistency in the photographic and data records. In some cases, it is not appropriate to locate a site nearby due to factors such as proximity to infrastructure, land system boundaries and changes in vegetation structure and type. Where Tier 1 sites are not appropriate for inclusion in the integrated monitoring program, sites continue to be photographed to expand the Tier 1 photo archive.

The integrated monitoring program relies on the Rangeland Monitoring Officers working with the knowledge and experience of land managers and lessees. Both the ground data collected and information products produced from satellite data require on-ground local knowledge and understanding to explain changes and gain a further understanding of landscape dynamics. Measured field data are used to better calibrate Landsat-derived products to the NT conditions and then validate their accuracy for specific locations. The two sources of information (ground based and remote sensing) are then interpreted with regard to the knowledge and experience of practical land managers to enable reporting of land condition at property, landscape and regional scales.

As the number of revisits increase at a site, the expanding monitoring record will allow changes in the vegetation and soils, and their probable causes, to be documented, in a similar way to that which is now possible for vegetation cover using remote sensing.

Remote sensing of the dynamics of vegetation cover

The remote sensing or satellite based data component of the integrated monitoring program was developed through a collaborative research program between the Northern Territory and Queensland Governments. Data from the program is used contribute to an internationally recognised method for systematically monitoring change in vegetation cover and its converse, bare ground, at a range of spatial and temporal scales. The 30-m pixel size of Landsat imagery allows change in vegetation cover to be analysed at site level (1ha) through to pastoral districts (~10 000km² to >130 000km²) and the entire NT (~1 346 500km²). Reporting interval can be as short as two weeks over a 33-year period (1988 to current).

Fractional cover

Analysis of the dynamics of vegetation cover within this Annual Report is based on fractional cover. This is an estimate of the three components of land cover that can be distinguished from the spectral data and collected by the Thematic Mapper instrument carried on the Landsat satellite (i.e. Landsat TM). The three components are bare ground (comprising soil, rocks and gravels), actively growing (photosynthetic) vegetation and senescent (non-photosynthetic) vegetation (including litter and hayed-off grass) (Figure 1):

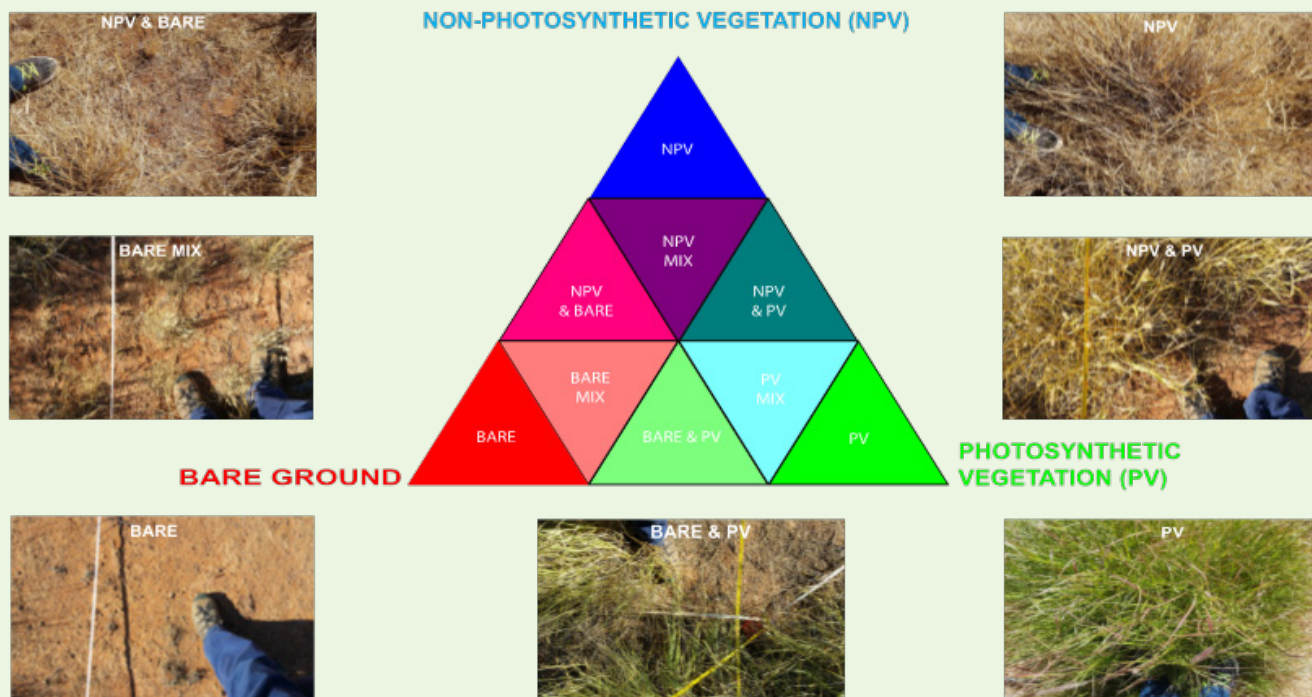


Figure 1: The three main fractions of cover and their mixtures or combinations as illustrated in fractional cover imagery.

The level of vegetation cover or bare ground present and its change over time is reported in two ways:

1. As the actual amount present during a specified period. For this report, this is September to November 2021, termed 'spring composite', coinciding with the latter part of the Dry season for central and northern pastoral districts and the time when early summer storms may promote pasture growth in the southern NT.
2. As a decile rank of vegetation cover present in late 2021 (winter or spring composite) compared with that present at similar times back to 1988.

Rainfall

The amount, timing and effectiveness of rainfall is a major driver of the quantity, composition and quality of pastures. Monitoring data collected using ground and remote sensing-based methods must account for the effects of variable rainfall in understanding the impacts of stocking rates and grazing management on the vegetation resource.

Due to the large variation in annual rainfall across the NT, a comparison of location-specific rainfall against its longer-term history is used to illustrate seasonal conditions (Figure 2).

Fire

Fire and its effect on vegetation cover across the NT cannot be understated. This can be seasonal in the savannah landscapes of the central and northern parts of the NT or relatively infrequent and episodic in the southern arid region.

Woody cover

The density of trees and shrubs changes over time in many rangeland environments but generally at a slower rate than changes in the pasture layer. A particular issue facing long-term sustainability of the pastoral industry in some landscapes is woody thickening, which can suppress pasture growth and reduce opportunities to use fire for broad scale control of problem tree or shrub species. Two remote sensing products are being adapted to the NT conditions to improve monitoring of vegetation cover dynamics. The first is a foliage projective cover product that discriminates woody cover from ground cover. The second is a probability-based model that allows ground cover under trees to be estimated. Both will allow improved monitoring of cover dynamics in woodland/savannah environments when suitably refined and validated, and therefore may be of use in the future.

Seasonal quality

'Seasonal quality' describes the relative value of recent rainfall in producing forage for livestock. It is judged with reference to the historical record. Total rainfall is compared with the long-term median. Descriptors of seasonal quality provide useful context for interpreting various measures of land condition. However, to the extent possible, land condition is assessed independently of seasonal conditions.

Pixel (grid cell) values are calculated from rainfall amounts at recognised Bureau of Meteorology recording stations. Rainfall is measured from May 2020 to April 2021 and therefore incorporates an entire growing season. Due to the considerable north-south transition in long-term median rainfall for the VRD and Barkly Pastoral Districts, rainfall statistics are reported based on an arbitrary split of the region into two sub-districts to report on seasonal quality.

CRITERIA USED TO ASSESS LAND CONDITION

Assessing land condition

Table 1 summarises how the pasture and woody layers, soil surface features and presence of any weeds are considered to assess land condition.

Table 1. Factors to assess land condition

Land Condition	Soil	Pasture	Weed	Woodland and Shrubland
A (= Excellent) All of these features	No erosion and good surface condition	Good coverage of palatable perennial grasses in the north and annual forage species in the south, minimal bare ground in most years	No weeds	No signs of woody thickening
B (= Good) At least one or more of these features	Minimal evidence of previous erosion or of current erosion risk	Some decline in the presence of palatable grasses and other forage species, a small increase in bare ground	Small infestations of weeds	Some thickening in the density of woody plants
C (= Fair) One or more of these features	Evidence of past erosion and/or current susceptibility to erosion	General decline in palatable perennial and annual grasses, obvious increase in the amount of bare ground	Obvious presence of weeds	General thickening in the density of woody plants
D (= Poor) One or more of these features	Severe erosion, scalding or compaction resulting in a hostile environment for plant growth	General lack of palatable forage species	Large weed infestations covering significant areas	Thickets of woody plants that cover significant area

2021 MONITORING SEASON AND PASTORAL DISTRICTS

Seasonal conditions

Rainfall from 1 May 2020 to 30 April 2021 compared with the long-term record was:

- Average to above average for large areas of the NT.
- Most of the VRD, Katherine, Roper, Sturt Plateau, Darwin, Gulf, Northern and Southern Alice Springs Pastoral Districts had above average rainfall.
- Most of the Barkly, Tennant Creek and Plenty Pastoral Districts had average rainfall.

Assessing Land Condition

Land condition was assessed using a combination of remotely sensed (satellite) and field (site) data, and lease inspections. Landsat data are used to indicate the proportions of vegetation cover (photosynthetic and non-photosynthetic) and bare ground in each pixel, an area of 0.09 ha. Change in each component can be examined since 1988 providing important information on cover dynamics over the last 33 years.

Decile ranked total vegetation cover for the spring seasonal composite image for 2021 (Figure 2) showed that in general total vegetation cover followed the rainfall pattern with average to above average cover when compared to the longer term baseline (1988–2013). While average total rainfall was recorded across the Barkly, Plenty and Tennant Creek Pastoral Districts, vegetation cover was well below the long-term baseline in parts of these districts. Despite recording generally above average rainfall, the Southern Alice Springs Pastoral District also recorded significant areas of lowest on record vegetation cover. Six pastoral districts (Katherine, Roper, Gulf, Sturt Plateau, VRD and Northern Alice Springs) recorded well-above average vegetation cover.

Figure 3 shows the relative levels of vegetation cover across the NT over the 2021 spring period (1 September 2021 – 30 November 2021). Vegetation cover is strongly influenced by the extent and significance of fire within individual pastoral districts, and the influence of rainfall on the amount of cover present. Grazing effects, where present, are more subtly embedded within these gross changes.

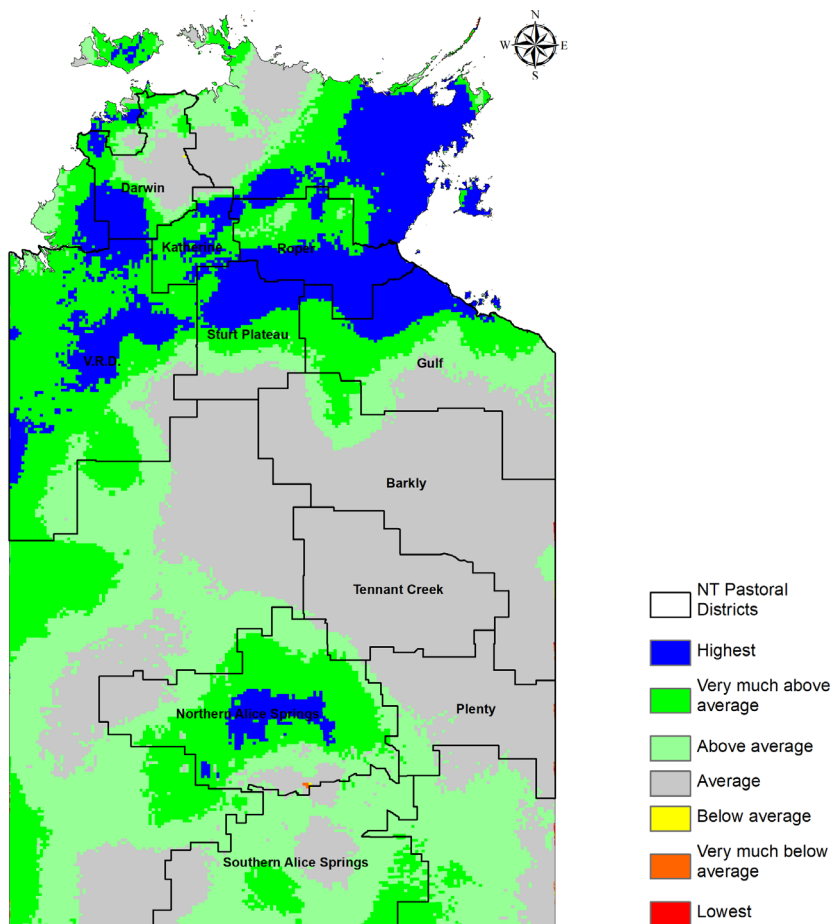


Figure 2. Decile ranked rainfall for May 2020 to April 2021

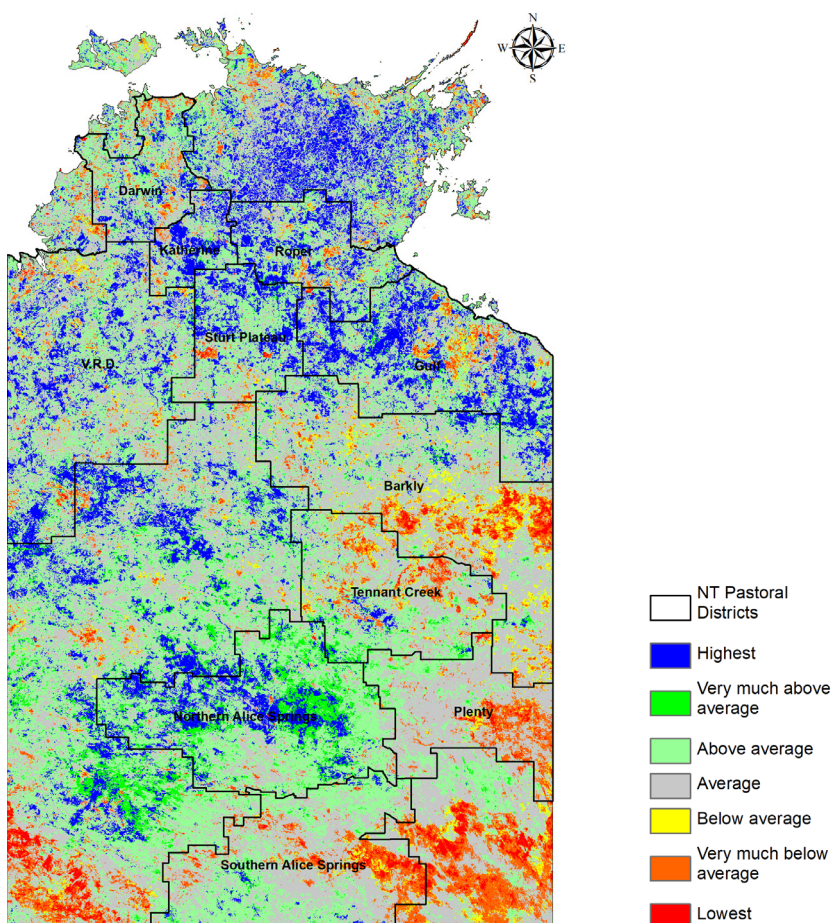


Figure 3. Decile ranked total vegetation cover for Spring 2021 seasonal composite image.

Land Condition Trend

The integrated monitoring program was introduced in 2013 and most pastoral leases have been monitored at least twice using this method. Table 2 shows land condition trends from the on-ground site inspections over time. The land condition rating of 40 pastoral leases improved, did not change or transitioned to a single rating (i.e. Good/Fair to Fair). The land condition rating of the only two pastoral leases monitored in the Barkly Pastoral District in 2021 declined from Good to Fair and the other from Good/Fair to Poor. Four pastoral leases in the VRD (2), Gulf (1) and Sturt Plateau (1) Pastoral Districts also declined from Good to Fair.

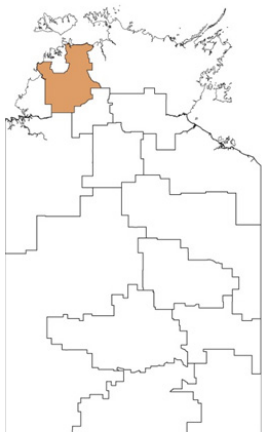
Table 2 should be read in conjunction with the detailed comments on the inspection of each pastoral district, which provides for factors and accounts contributing to a change in land condition rating.

Table 2. Land condition trend of leases in pastoral districts in 2021 and the change since the lease was last monitored.

Pastoral lease	Land condition at previous inspection	2021 land condition	Land condition trend
Darwin Pastoral District			
1	Good (2015)	Good	steady
2	Fair (2016)	Fair	steady
3	Fair (2015)	Fair	steady
4	Fair (2016)	Fair	steady
5	Fair (2016)	Fair	steady
6	Good (2015)	Good	steady
7	Good (2015)	Good	steady
Roper Pastoral District			
1	Fair (2016)	Good	improve
2	Fair (2016)	Fair	steady
3	Fair (2016)	Fair	steady
VRD Pastoral District			
1	Fair (2016)	Fair	steady
2	Good (2015)	Fair	decline
3	Fair (2016)	Fair	steady
4	Good (2014)	Fair	decline
5	Good/Fair (2016)	Fair	transitioned to a single rating
6	Fair (2016)	Fair	steady
7	Fair (2016)	Fair	steady
8	Fair (2016)	Good	improve
Sturt Plateau Pastoral District			
1	Good (2016)	Good	steady
2	Good (2016)	Fair	decline

Pastoral lease	Land condition at previous inspection	2021 land condition	Land condition trend
Gulf Pastoral District			
1	Good (2016)	Fair	decline
2	Fair (2016)	Good	improve
3	Fair (2016)	Fair	steady
4	Fair (2016)	Fair	steady
5	Fair (2016)	Good	improve
Barkly Pastoral District			
1	Good (2016)	Fair	decline
2	Good/Fair (2018)	Poor	significant decline
Tennant Creek Pastoral District			
1	Fair (2016)	Fair	steady
2	Good/Fair (2016)	Fair	transitioned to a single rating
3	Fair (2016)	Fair	steady
Plenty Pastoral District			
1	Good/Fair (2016)	Fair	transitioned to a single rating
2	Good/Poor (2016)	Fair	transitioned to a single rating
Northern Alice Springs Pastoral District			
1	Poor (2016)	Fair	improve
2	Fair (2016)	Good	improve
3	Fair/Poor (2016)	Fair	transitioned to a single rating
4	Poor (2016)	Fair	improve
5	Good/Fair (2016)	Good	transitioned to a single rating
6	Good (2016)	Good	steady
7	Fair (2016)	Fair	steady
8	Good/Fair (2016)	Fair	transitioned to a single rating
9	Fair (2016)	Fair	steady
10	Fair/Poor (2016)	Good	transitioned to a single rating
11	Good (2016)	Good	steady
Southern Alice Springs Pastoral District			
1	Fair (2016)	Fair	steady
2	Fair/Poor (2016)	Fair	transitioned to a single rating
3	Fair/Poor (2016)	Fair	transitioned to a single rating

DARWIN PASTORAL DISTRICT



The Darwin Pastoral District covers 37 000km² over 23 pastoral leases.

Rainfall was average to above average across the Darwin Pastoral District (Table 3). Rainfall distribution varied with very-much-above average rainfall occurring in the north and south-west of the District. Average rainfall occurred across 33% of the District and the remainder District ranged from average to very-much-above average rainfall.

Vegetation cover in late 2021 was average to very-much-above average, reflecting the high rainfall across the District.

The Darwin Pastoral District experienced extensive and frequent fire, with 18 500km² burnt between January and December 2021 (Figure 4). The highest proportion of fire occurred during May 2021 with just over 23% of the District burnt.

On-ground monitoring for land condition was conducted at 25 sites on seven pastoral leases. Vegetation cover was generally good at all sites, except for sites that were impacted by fire. Bare ground was low at most sites and was not considered to be an issue in this District.

Perennial and annual grasses dominated vegetation cover, with forb cover being exceptionally low. Litter cover was also generally at low levels.

Overall land condition of all seven leases inspected in 2021 were rated as Good or Fair. All the leases maintained their overall land condition rating since the previous inspection.

Table 3. Rainfall for the Darwin Pastoral District.

Rainfall (mm)

2021	1 478
Long-term median (1900–2020)	1 266

DARWIN PASTORAL DISTRICT

Fire

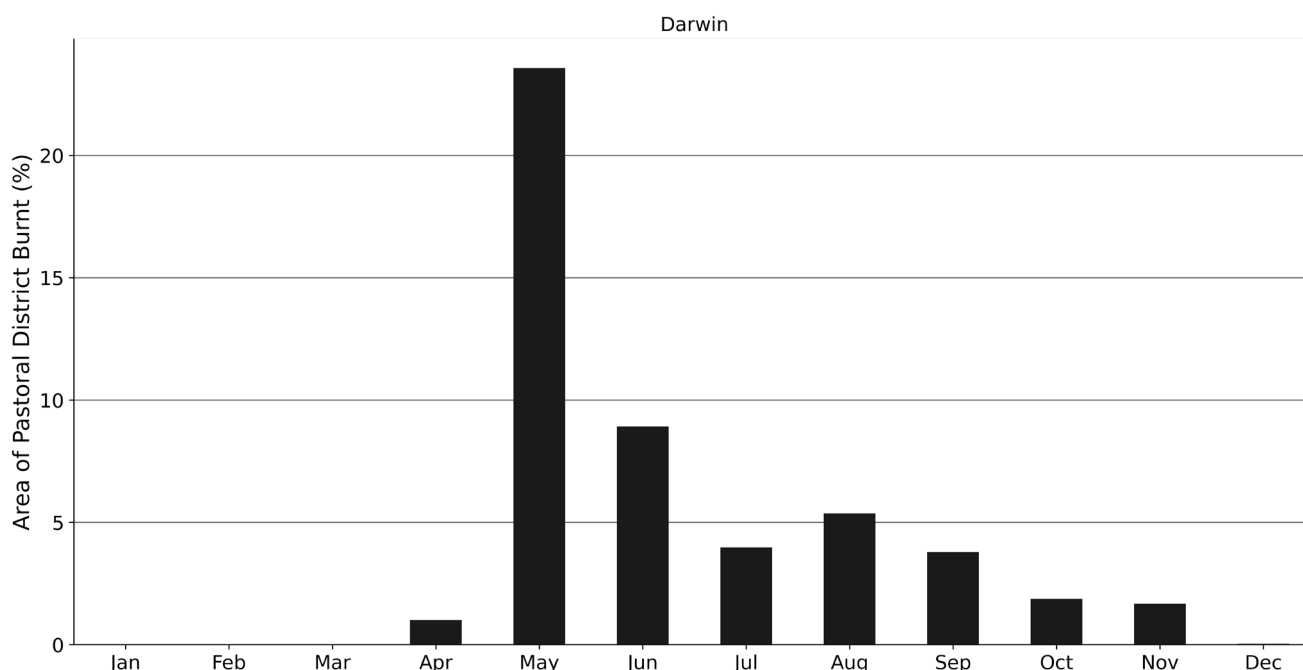


Figure 4. Percentage of the area burnt each month in the Darwin Pastoral District.

Total vegetation cover and bare ground dynamics

It is important to maintain adequate ground cover in the latter months of each year to minimise ground loss from wind erosion and intense summer storms. It is also important to carry dry feed, and associated ground cover, into the latter months of each year in case there is a late start to the usual wet season and/or monsoonal rains fail more generally.

The amount of vegetation present at any location changes from year to year depending on rainfall and its effectiveness, fire history and amount of grazing. The percentage of vegetation in each 30m square Landsat pixel (900m² or 0.09ha) was used to report the amount of vegetation cover across all pixels in the Darwin Pastoral District for the end of dry season (September to November Spring composite).

Vegetation cover was average to above average across most of the Darwin Pastoral District (Figure 5). Approximately 37% of the District was ranked as average, 13% was above average, 15% much-above average and 20% was very-much-above average. Only 15% of the District was ranked as having vegetation cover below to very-much below average, which is generally associated with the occurrence of fires across the District. The above average vegetation cover across the District is likely to be influenced by the above average rainfall which occurred across the District in the preceding wet season.

DARWIN PASTORAL DISTRICT

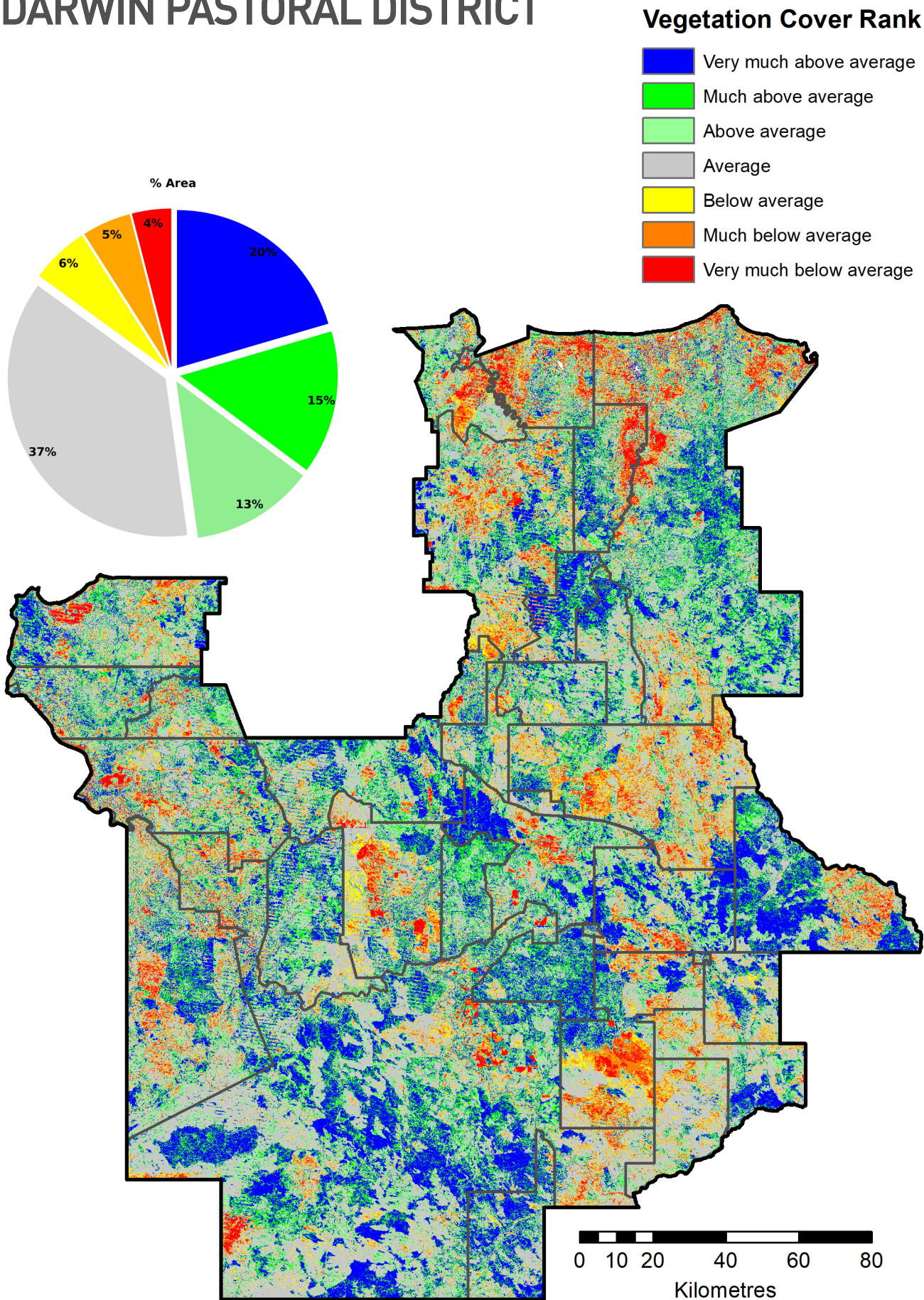


Figure 5. Rank of the amount of remotely sensed vegetation cover present in late 2021 in the Darwin Pastoral District against previous years back to 1988. Pie chart shows the percentage of area of each vegetation cover rank

DARWIN PASTORAL DISTRICT

Site-based monitoring

Seven pastoral leases in the Darwin Pastoral District were visited in 2021 (Table 4). Vegetation cover of the ground layer was measured at 25 sites on these leases.

Vegetation cover was generally good at all sites, except for several sites that were impacted by fire. Good vegetation cover is common in the Darwin Pastoral District due to the good rainfall across the District. Bare ground was low at most sites in the absence of fire. Perennial and annual grasses dominated vegetation cover, with forb cover being exceptionally low. Litter cover was also generally at low levels.

Monitoring sites in Excellent to Good condition generally occurred on the floodplains and had a very high vegetation cover dominated by perennial grasses. Introduced grasses of high grazing value, such as para grass or tully grass, also dominated floodplain sites. Weed occurrence was very low at these sites.

Monitoring sites in Fair to Poor condition occurred in the uplands and woodlands. When compared to the higher condition sites, they had a low vegetation cover and higher areas of bare ground. These sites had a very low proportion and diversity of perennial grasses when compared to the higher condition sites. 3P grasses (productive, perennial and palatable) were very low in cover or were absent altogether. When perennial grasses were present, they were generally of low grazing value. This is likely due to the natural species composition of the area and the long-term grazing and fire history. Varying abundances of widespread and common weeds were observed.

Table 4. Summary of land condition assessments in the Darwin Pastoral District.

Pastoral lease	Land condition rating by sites	Comments on land condition
1	Excellent: 1 Good: 1 Fair: 1	<p>Overall land condition was assessed as Good, which is consistent with the assessment in 2015.</p> <p>There was a distinct difference in condition between the upland and floodplain country. The monitoring sites in Excellent condition on the floodplains were dominated by para grass, had high vegetation cover (>70%) and a low occurrence of weeds.</p> <p>Upland sites contained a mixture of improved and native grasses. The native grasses had low or no cover of 3P grasses. Regeneration of eucalypt, corymbia and pandanus species was occurring in upland paddocks that were previously cleared to sow improved pasture.</p> <p>Priority weed species observed were Siam weed and mimosa, which are being actively managed. Olive hymenachne was also recorded at the floodplain-improved pasture monitoring sites.</p> <p>Bare ground was generally low across the property (<10%), due to the regular, high wet-season rainfall and low incidence of fire.</p> <p>Gully erosion was recorded at several locations along the northern boundary and adjacent to old laneways. Management measures are being implemented to address the erosion issues.</p>

DARWIN PASTORAL DISTRICT

Pastoral lease	Land condition rating by sites	Comments on land condition
2	Excellent: 1 Fair: 3 Poor: 1	<p>Overall land condition was assessed as Fair, which is consistent with the assessment in 2016.</p> <p>There was a distinct difference in condition between the woodland and floodplain country. The monitoring sites in Excellent condition were common on the floodplain. They were dominated by para grass, had high vegetation cover (>70%) and a low occurrence of weeds.</p> <p>The monitoring sites in Fair condition were common in the woodland and contained mixed native tussock and annual grasses. Common weeds, such as hyptis and sida species, were observed.</p> <p>Mimosa is a long-standing issue on the floodplains but it is actively managed. It was only recorded in areas with reduced vegetation cover and elevated bare ground. Control of mimosa has been successful across the property, with old records no longer present. Other common weeds that were observed include sicklepod, hyptis and sida species.</p> <p>Erosion was recorded along several tracks in the southeast but did not appear to be active.</p> <p>Feral pigs and buffalo were observed.</p> <p>There has been a low frequency of fires on the floodplains over the past 10 years but regular fire in the adjacent woodlands. The mean percentage of the lease burnt annually over the past 20 years is 44%, with a larger area burning over the last ten years than in the previous decade (58% vs 37%).</p> <p>Bare ground is generally low across the property (<10%), with changes correlated with wet-season rainfall and fire.</p>
3	Fair: 3	<p>Overall land condition was assessed as Fair, which is consistent with the assessment in 2015.</p> <p>Native tussock and annual grasses dominated the property. Vegetation cover was good at unburnt sites (55–100%). 3P grass diversity and cover were consistently low. This is likely due to the natural species composition and the long-term grazing and fire history. Changes in species cover from sites that were inspected at both the 2016 and 2021 visits indicated a reduction in 3P grass cover and an increase in less-palatable grass species.</p> <p>Mimosa was actively managed, with the infestation reduced by 50% from pre-control levels. Other weeds observed included gamba grass, annual mission grass, hyptis and sida species.</p> <p>Gully erosion was recorded along old fence lines and tracks. Mitigation measures included spoon drains, grading and moving fence lines.</p> <p>Buffalo were observed, including in waterholes.</p> <p>The property has had a very high frequency and percentage of the property burnt over the past 10–20 years. Large areas of the property have been burnt 7–10 times in the last decade and the average percentage of the lease burnt annually over the past 20 years is moderately high at 65%. There are no areas of bare ground that are persisting outside of the infrastructure footprint, or natural features that are expected to have bare ground.</p>

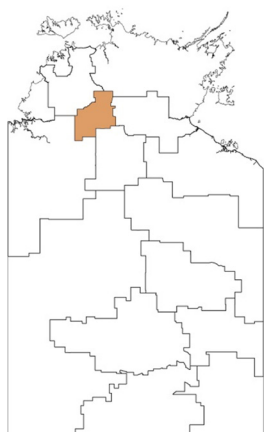
DARWIN PASTORAL DISTRICT

Pastoral lease	Land condition rating by sites	Comments on land condition
4	Excellent: 1 Fair: 2	<p>Overall land condition was assessed as Fair, which is consistent with the assessment in 2016.</p> <p>Native tussock and annual grasses of low palatability dominated the property. Vegetation cover varied from low to high (18–89%). 3P grass diversity and cover was consistently low. This is likely due to the natural species composition and the long-term grazing history.</p> <p>Mimosa is a long-standing issue along the creek but it is actively managed. Other weeds observed included sicklepod, hyptis and sida species. Gamba grass was present along tracks near the homestead and surrounding paddocks, and along the north-south laneway.</p> <p>Buffalo were observed.</p> <p>Potential woody thickening was observed at several sites and the land manager said that woody thickening also occurred along the creeks.</p> <p>The lease has had a very low frequency of fires over the southern two thirds of the property for the past 10 years. The most frequently burnt areas (6–9 times in the past 10 years) occur in the north. The main east-west access road acts as a fire break to southern paddocks. The average percentage of the lease burnt annually over the past 20 years is 18%. There are no areas of bare ground that are persisting outside of the infrastructure footprint or natural features.</p>
5	Fair: 3 Poor: 1	<p>Overall land condition was assessed as Fair, which is consistent with the assessment in 2016.</p> <p>Native tussock and annual grasses dominated the property. Vegetation cover was generally good at most sites (23–85%) and 3P grass cover was consistently low. This is likely due to the natural species composition and the long-term grazing and fire history. Changes in species cover from sites that were inspected in 2016 and 2021 indicate a reduction in 3P grass cover and increase in the less-palatable wanderrie grass.</p> <p>Mimosa, gamba grass, sicklepod, hyptis and sida species were recorded.</p> <p>Gully erosion was recorded, including along old fence lines and tracks.</p> <p>Buffalo and pigs were sighted. The land manager noted that wild dogs are a problem and are baited each year.</p> <p>The property has had a very high frequency of fire and percentage of the property burnt over the past 10–20 years. The western side of the property has burnt 8–10 times in the last decade and the mean percentage of the lease burnt annually over the past 20 years was high at 72%. There are no areas of bare ground that are persisting outside of the infrastructure footprint and therefore bare ground is not an issue for the Lease.</p>

DARWIN PASTORAL DISTRICT

Pastoral lease	Land condition rating by sites	Comments on land condition
6	Excellent: 1 Good: 1	<p>Overall land condition was assessed as Good, which is consistent with the assessment in 2015.</p> <p>There was a distinct difference in condition between the floodplain and upland country. Sites in Excellent/Good condition on the floodplain were dominated by para grass, had high vegetation cover (>70%) and a low occurrence of weeds. Upland sites contained a mixture of improved and native grasses. However, observed native species were generally of low grazing value. Regeneration of eucalyptus, corymbia and pandanus species was observed in upland improved pasture paddocks, which have been cleared previously to sow improved pastures.</p> <p>Gamba grass was recorded along laneways, particularly along the main north-south laneway. Commonly occurring weeds including hyptis, sickle pod and weedy sida species were observed.</p> <p>The property has had a low frequency of fires on the floodplains over the past 10 years. The most frequently burnt areas occurred in the upland country, which are plains and rises with woodlands over native tussock grasslands.</p> <p>Bare ground was generally low across the property at <12% and correlated well with regular, high wet-season rainfall and low incidence of fire. Peaks in bare ground were associated with fire and vegetation cover always increased to average levels following the wet season rainfall.</p>
7	Excellent: 3 Poor:1	<p>Overall land condition was assessed as Good, which is consistent with the assessment in 2015.</p> <p>There was a distinct difference in condition between woodland country and the floodplains. Sites in Excellent condition were common on the improved pasture floodplains. These sites had high vegetation cover (>70%) and low occurrence of weeds. Woodland sites and native floodplain sites were generally in poorer condition and contained a mixture of native tussock and annual grasses. The woodland sites contained no 3P grasses.</p> <p>Gamba grass, annual mission grass, sickle pod, prickly acacia and mimosa were observed. Gamba grass is actively managed around laneways, yards and paddocks. Mimosa is actively managed with old records no longer present. Prickly acacia was recorded on the banks of the dam of a paddock.</p> <p>Buffalo and pigs were observed. Pigs are controlled through permitted shooting. Illegal hunting of pigs and buffalo on the property is an ongoing issue.</p> <p>There has been a low frequency of fires on the floodplains over the past 10 years and regular fire in the woodlands in the southeast around yards and in high traffic areas. The average percentage of the lease burnt annually over the past 20 years is 16%.</p> <p>Bare ground was generally low across the property (6–10%). Changes in bare ground were correlated with wet-season rainfall and fire. Recovery of vegetation cover following fire was observed to be good.</p>

KATHERINE PASTORAL DISTRICT



The Katherine Pastoral District covers 19 000km² over nine pastoral leases.

Rainfall was average across the Katherine Pastoral District. Spatially averaged rainfall for the Katherine Pastoral District was well above the long-term median (Table 5).

Vegetation cover in late 2021 was average to above average, reflecting the average to high rainfall across the District.

The Katherine Pastoral District experienced frequent fire, with 6 500km² burnt between April and December 2021 (Figure 6). Fire in April and May is likely to reflect managed early dry season burns. The highest proportion of fire occurred during November 2021 with just over 14% of the District burnt.

No pastoral leases were monitored in the Katherine Pastoral District.

Table 5. Rainfall for the Katherine Pastoral District.

Rainfall (mm)

2021	1 169
Long-term median (1900–2020)	859

KATHERINE PASTORAL DISTRICT

Fire

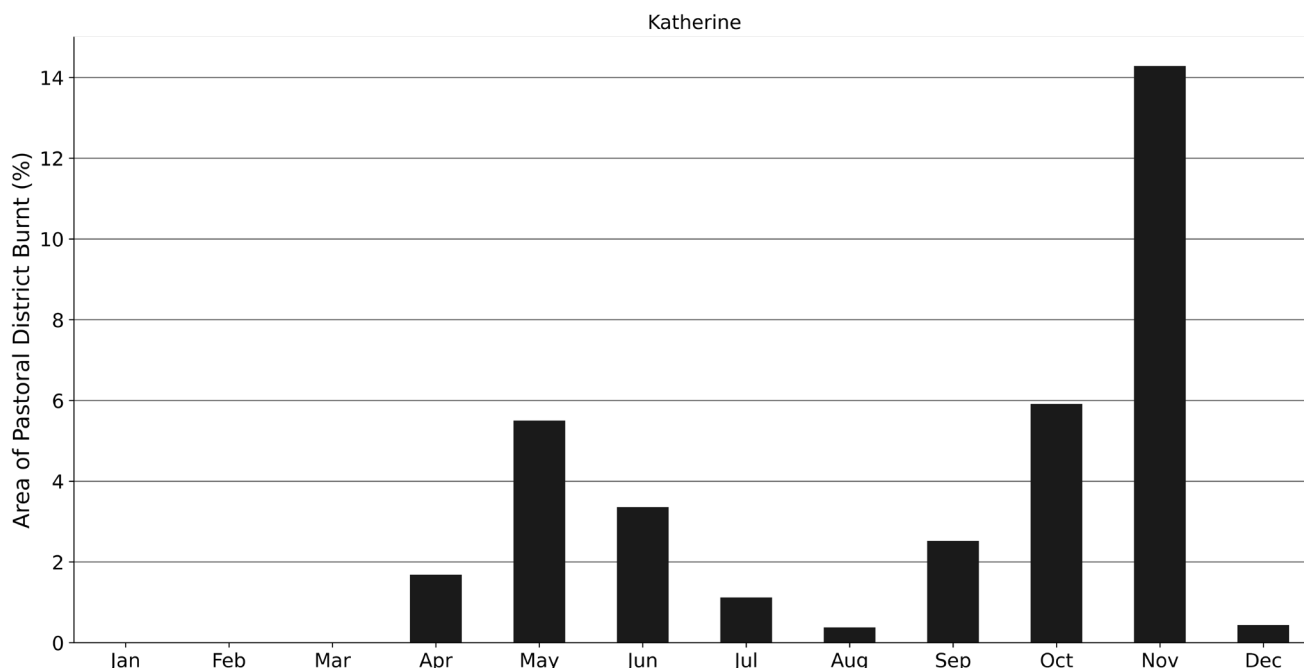


Figure 6. Percentage of the area burnt each month in the Katherine Pastoral District.

Total vegetation cover and bare ground dynamics

It is important to maintain adequate ground cover in the latter months of each year to minimise soil loss from wind erosion and intense wet-season storms. It is also important to carry dry feed, and associated ground cover, into the latter months of each calendar year in case there is a late start to the usual wet season and/or monsoonal rains fail more generally.

The amount of vegetation present at any location changes from year to year depending on rainfall and its effectiveness, fire history and amount of grazing. The percentage of vegetation in each 30m square Landsat pixel (900 m² or 0.09 ha) was used to report the amount of vegetation cover across all pixels in the Katherine Pastoral District for the end of dry season (September to November Spring composite).

Vegetation cover was above average across most of the Katherine Pastoral District (Figure 7). Approximately 63% of the District was ranked as above average to very-much above average, 29% was average and only 8% was below average cover. Fire contributed to some of the areas with lower vegetation cover. However, not all areas with low vegetation cover correspond with fire.

KATHERINE PASTORAL DISTRICT

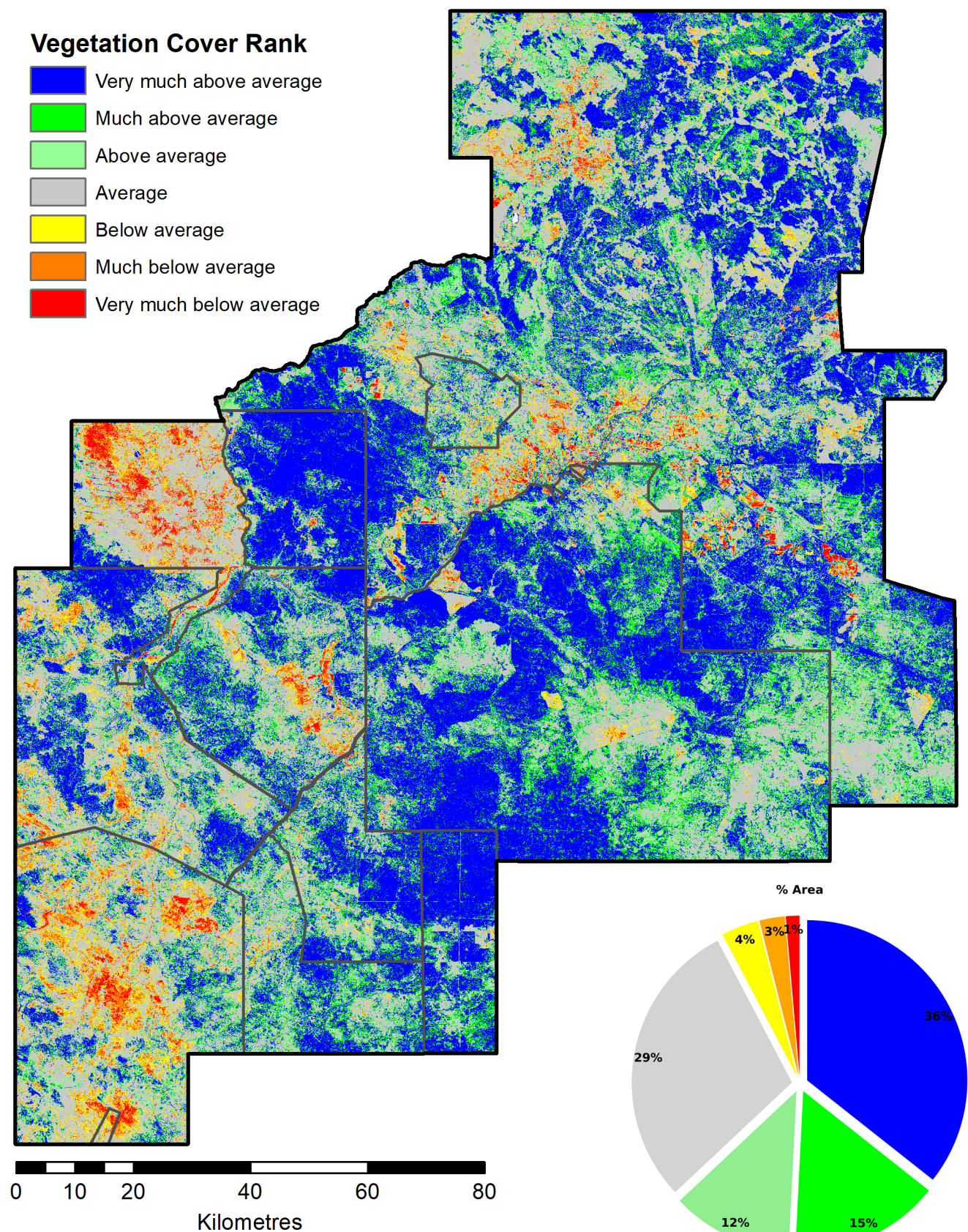
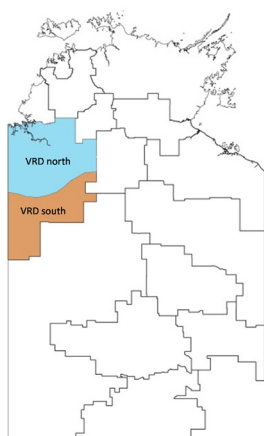


Figure 7. Rank of the amount of remotely sensed vegetation cover present in late 2021 in the Katherine Pastoral District against previous years back to 1988. Pie chart shows the percentage of area of each vegetation cover rank.

VRD PASTORAL DISTRICT



The VRD Pastoral District covers 134 000km² over 11 pastoral leases.

Rainfall was average to well-above average across the VRD Pastoral District. Spatially averaged rainfall for the north and south sub-Districts of the VRD Pastoral District was above the long-term median across each sub-District (Table 6). Rainfall was well-above average in the north, above average in the south and west and average in the east of the District.

Vegetation cover in late 2021 was average to above average for most of the VRD Pastoral District, reflecting the consistent rainfall across the District. Approximately 11% of the District had vegetation cover well below to below average when compared with the long-term record.

The VRD Pastoral District experienced frequent fire throughout 2021, with 25 500km² burnt between January and December 2021 (Figure 8). Fire was most extensive during May 2021. However, most of the fire activity was not on pastoral leases.

On-ground monitoring was conducted at 59 sites on eight pastoral leases. Vegetation cover on average represented just over half of the total cover for the 59 sites, with a higher proportion of perennial grasses, followed by annual grasses and forbs. Bare ground represented just under one quarter of the total cover. There was high variability between sites, with sites ranging between 1 and 73% of cover. Litter cover also varied between the sites with values between 3 and 73%. One site was Excellent, 24 were Good, 27 were Fair and seven were Poor.

Overall land condition of seven of the eight leases inspected in 2021 were rated as Fair and one was Good. One lease improved from Fair to Good, four maintained a Fair rating and one transitioned to a single rating (i.e. Good/Fair to Fair). Two leases declined from Good to Fair.

Table 6. Rainfall for the VRD Pastoral District.

Rainfall (mm)		
2021	1 036	650
Long-term median (1900–2020)	753	470

VRD PASTORAL DISTRICT

Fire

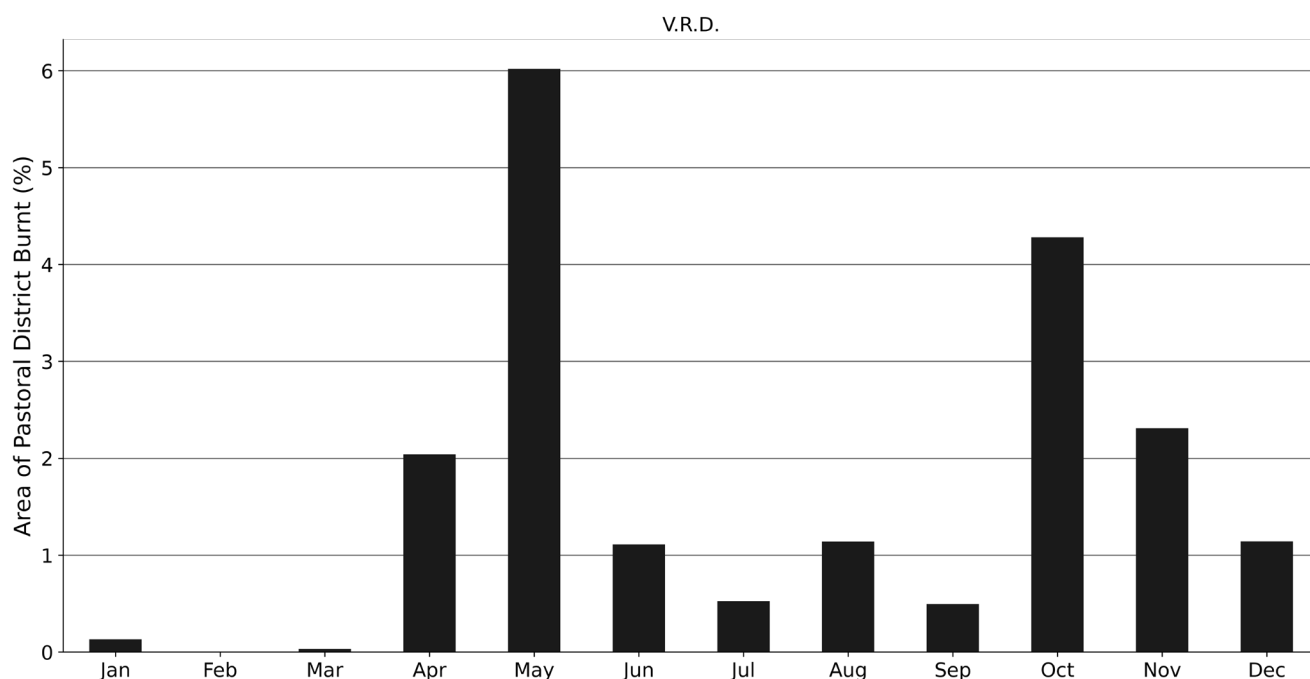


Figure 8. Percentage of the area burnt each month in the VRD Pastoral District.

Total vegetation cover and bare ground dynamics

It is important to maintain adequate ground cover in the latter months of each year to minimise soil loss from wind erosion and intense summer storms. It is also important to carry dry feed, and associated ground cover, into the latter months of each calendar year in case there is a late start to the usual wet season and/or monsoonal rains fail more generally.

The amount of vegetation present at any location changes from year to year depending on rainfall and its effectiveness, fire history and amount of grazing. The percentage of vegetation in each 30m square Landsat pixel (900m² or 0.09 ha) was used to report the amount of vegetation cover across all pixels in the VRD Pastoral District for the end of dry season (September to November Spring composite).

Vegetation cover was above to well-above average across most of the VRD Pastoral District (Figure 9). Approximately 52% of the District was ranked as well above, 37% was average and 11% was below average to well below average. The above average cover across the District is likely to be related to the above average rainfall and the isolated areas of below average cover were associated with the occurrence of fire.

VRD PASTORAL DISTRICT

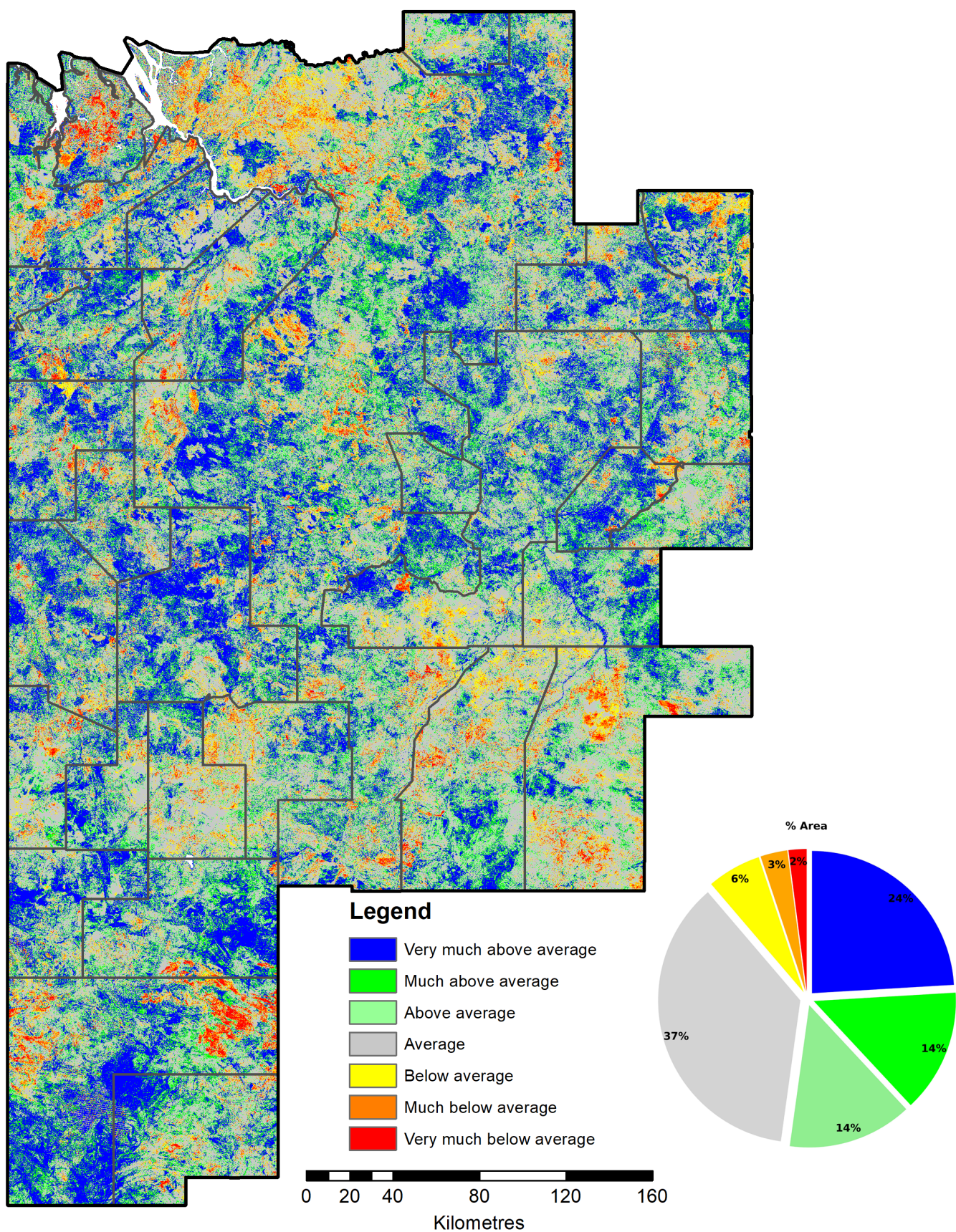


Figure 9. Rank of the amount of remotely sensed vegetation cover present in late 2021 in the VRD Pastoral District against previous years back to 1988. Pie chart shows the percentage of area of each vegetation cover rank.

VRD PASTORAL DISTRICT

Site-based monitoring

Eight pastoral leases in the VRD Pastoral District were visited in 2021 (Table 7). Vegetation cover of the ground layer was measured at 59 sites on these leases.

Vegetation cover was generally good at all sites. Bare ground was low at most sites and was not considered an issue in the VRD Pastoral District. Perennial and annual grasses dominated vegetation cover, with forb cover being very low. Litter cover was also generally low.

Monitoring sites in Excellent to Good condition occurred in a variety of land systems and had a very high vegetation cover, with this cover mostly being dominated by perennial grasses, including a range of 3P (palatable, perennial and productive) grasses. Annual grasses and forbs had low cover and leaf litter cover was quite low.

Monitoring sites in Fair to Poor condition had lower vegetation cover and high areas of bare ground. The main difference in these sites was composition of the pasture species. While perennial grasses were still present, they were of lower density and robustness. Less 3P grass species were recorded and instead lower value pasture grasses or forbs replaced them, which were dominant at some sites. Different species compositions are likely to be due to the natural species composition of some of the land systems, with naturally different grazing values, but also the long-term grazing and fire history.

Weeds and erosion issues were generally not observed at any of the monitoring sites.

Table 7. Summary of land condition assessments in the VRD Pastoral District.

Pastoral lease	Land condition rating by sites	Comments on land condition
1	Excellent: 1 Good: 5 Fair: 6	<p>Overall land condition was assessed as Fair, which is consistent with the assessment in 2016.</p> <p>Land condition varied across the lease. The monitoring sites in Good condition had a good vegetation cover and diversity of desirable perennial species. Sites in Fair condition had annual grasses, undesirable grass species, and bare ground. The sites in Poor condition were limited and confined to historically overgrazed natural and artificial water points.</p> <p>Rubber bush and parkinsonia were observed. The species were well monitored and managed with a decrease in plants since 2016.</p> <p>Gully erosion was observed. Newly created roads had been constructed with whoa-boys to divert water away from the road.</p> <p>Camels were observed.</p> <p>There was one area of Eucalypt woody thickening in one paddock.</p> <p>Fires have occurred every year since 2000. The mean percentage of the lease burnt annually in the past 20 years is 23%, with the worst fire year being 2017, where 62% of the property burnt. Since the last inspection in June 2016, approximately 65% of the lease has been burnt with 95% of that occurring in 2017.</p>

VRD PASTORAL DISTRICT

Pastoral lease	Land condition rating by sites	Comments on land condition
2	Good: 4 Fair: 5	<p>Overall land condition was assessed as Fair, which has declined from the Good rating in 2015.</p> <p>Land condition varied across the lease. Desirable perennial grass cover has decreased and have been replaced by annual grasses and forbs. This change in pasture composition is likely the result of the land recovering from a number of poor wet seasons.</p> <p>Parkinsonia and rubber bush were observed, including single plants and medium density infestations.</p> <p>Slight to moderate gully erosion was observed along roads and fence lines.</p> <p>No woody thickening was observed.</p> <p>Camels and donkeys were not sighted but grazing patterns, tracks and scats indicated the likely presence.</p> <p>Fires have occurred in most years since 2000. The mean percentage burnt annually is 13%; 2012 was the worst fire year when 55% of the lease burnt. Since the last inspection, approximately 29% of the property has burnt.</p>
3	Good: 4 Fair: 2 Poor: 1	<p>Overall land condition was assessed as Fair, which is consistent with the assessment in 2016.</p> <p>Land condition varied across the lease. The monitoring sites in Good condition had good vegetation cover of palatable perennial grass species.</p> <p>Parkinsonia, rubber bush and coffee senna were observed, including medium density infestations.</p> <p>Slight to moderate gully erosion was observed along roads and fence lines. One location was being actively managed.</p> <p>A herd of camels and donkeys were observed in the north of the lease. A single dingo was also recorded.</p> <p>No woody thickening was observed.</p> <p>The lease has experienced fires in most years since 2000. The mean percentage burnt annually is 12%. Approximately 40% of the property has burnt since the last inspection.</p>

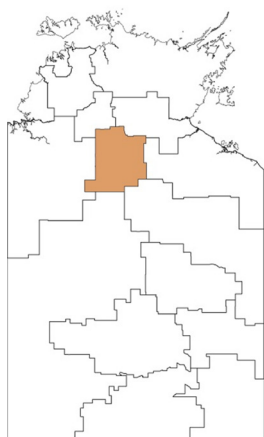
VRD PASTORAL DISTRICT

Pastoral lease	Land condition rating by sites	Comments on land condition
4	Good: 2 Fair: 2 Poor: 1	<p>Overall land condition was assessed as Fair, which has declined from the Good rating in 2014.</p> <p>Land condition varied across the lease. The property appeared to be in a recovery phase following a number of poor wet seasons from 2017 to 2020.</p> <p>The monitoring sites in Good condition had a good vegetation cover and diverse desirable perennial grass species. The sites in Fair condition displayed a greater amount of undesirable species, indicating they are recovering from the poor wet seasons between 2017 and 2020 at a slower rate than other areas. Sites in Fair condition had higher utilisation levels, which restrict the recovery compared to less utilised areas.</p> <p>The monitoring sites in Poor condition had very little or no grasses and were dominated by undesirable forbs. In the northern pastoral paddocks, a number of areas were dominated by yellow hibiscus.</p> <p>Parkinsonia and hyptis species were observed; infestations ranged from an individual plant to large infestations with no evidence of control methods.</p> <p>Gully erosion was observed along roads and fence lines. Some of these areas have naturally stabilised due to an increase in pasture cover.</p> <p>No feral animals or woody thickenings were observed.</p> <p>Fires have occurred every year since 2000, with a mean percentage burnt annually of 9%. Since 2000, the highest fire activity was in 2015 where 28% of the pastoral lease burnt, mostly in the southern section of the property. Since the last inspection in 2014, approximately 35% of the pastoral lease has burnt with a number of areas re-burning on more than one occasion.</p>
5	Good: 3 Fair: 3 Poor: 2	<p>Overall land condition was assessed as Fair, which has transitioned to a declined single rating from the Good/Fair rating in 2016.</p> <p>Land condition varied across the lease. Desirable perennial grass cover has decreased and has been replaced by annual grasses and forbs.</p> <p>Bellyache bush, parkinsonia, rubber bush and hyptis species were observed; infestations ranged from an individual plant to large infestations (>200m).</p> <p>Active gully erosion was recorded and ranged from small rills along tracks and in bare areas to severe and extensively gullied drainage lines.</p> <p>Several donkeys and camels were observed. A single dingo was also recorded.</p> <p>Fires have occurred in the majority of years since 2000. The mean percentage burnt annually is 17% with over 40% being burnt in 2001, 2004, 2006 and 2012.</p>

VRD PASTORAL DISTRICT

Pastoral lease	Land condition rating by sites	Comments on land condition
6	Good: 2 Poor: 1	<p>Overall land condition was assessed as Fair, which is consistent with the assessment in 2016.</p> <p>Land condition varied across the lease. The monitoring sites in Good condition indicated there was a general lack of pasture response to the above average wet season rainfall. This has resulted in desirable perennial species being replaced with annual grass species. There were also some areas that appeared to be preferentially grazed at a high utilisation rate.</p> <p>Parkinsonia, hyptis, coffee senna and noogoora burr were observed, in medium to large infestations.</p> <p>Gully erosion was observed along roads and fence lines.</p> <p>Wild dogs/dingos and a herd of wild horses were observed.</p> <p>No woody thickening was observed.</p> <p>Fires have occurred every year since 2000, with a mean percentage burnt annually of 28%. Since the last inspection in 2016, approximately 75% of the property has burnt with a number of areas burning on more than one occasion. In 2021, 8% of the pastoral lease was burnt.</p>
7	Fair: 4 Poor: 2	<p>Overall land condition was assessed as Fair, which is consistent with the assessment in 2016.</p> <p>Land condition varied across the lease. Annual grasses and forbs increased in dominance, which may indicate the property is in a recovery phase following a dry cycle. The black soil areas appeared to be historically preferentially grazed leading to less pasture resilience in these areas compared to the less productive red soils.</p> <p>Rubber bush and downy thornapple species were observed.</p> <p>Newly graded roads use whoa-boys and spoon drains to divert water away from the road.</p> <p>No woody thickening was observed.</p> <p>Dingo/wild dogs and a herd of camels were observed.</p> <p>Fires have occurred every year since 2000 with varying amounts of the property burnt. The mean percentage of the lease burnt annually since 2000 is 15% with more than half the property burning in 2012 due to high fuel loads following on from a number of good wet seasons. Due to a number of recent poor wet seasons, less than 3% of the lease has burnt since the beginning of 2019.</p>
8	Good: 4 Fair: 5	<p>Overall land condition was assessed as Good, which has improved from the Fair rating in 2016.</p> <p>Land condition varied across the lease. The improvement in land condition is mainly due to good wet season rainfall, which increased vegetation cover and allowed desirable perennials to grow and recruit.</p> <p>Rubber bush was observed.</p> <p>Feral horses were observed.</p> <p>Woody thickening, dominated by wattles was observed at one location.</p> <p>Active erosion was not observed during the inspection.</p> <p>Fires have occurred in the majority of years since 2000, with the exception of 2003, 2005, and the years from 2019 through to 2021. The mean percentage of the pastoral lease burnt annually in the past 20 years is 16%, with the worst fire year being 2012, where 37% burnt due to high fuel loads from two good wet seasons. Since the last inspection in 2016, there were significant fires in 2017 that burnt 35% of the property.</p>

STURT PLATEAU PASTORAL DISTRICT



The Sturt Plateau Pastoral District covers 43 000km² over 31 pastoral leases.

Rainfall was average to above average across the Sturt Plateau Pastoral District. Spatially averaged rainfall for the Sturt Plateau Pastoral District was above the long-term median (Table 8). Rainfall varied significantly across the District with a minimum in the south of 454mm and a maximum in the north of 1264mm.

Vegetation cover in late 2021 was average to above average, reflecting the variable rainfall across the District.

The Sturt Plateau Pastoral District experienced sporadic but consistent fire, with 6 000km² burnt between January and December 2021 (Figure 10). The highest proportion of fire occurred during October to December 2021.

On-ground monitoring of land condition was conducted at 13 sites on two pastoral leases. Vegetation cover was generally good at all sites. Bare ground was low and was not considered an issue in this District. Perennial grasses at all sites and annual grasses dominated vegetation, while cover and forbs were low. Leaf litter cover was at low to moderate levels. Five monitoring sites were assessed as Good, seven in Fair, and one in Poor condition.

Overall land condition of the two leases inspected in 2021 were rated as Good and Fair. One lease maintained a Good rating, whereas the other lease declined from Good to Fair.

Table 8. Rainfall for the Sturt Plateau Pastoral District

Rainfall (mm)	
2021	872
Long-term median (1900–2020)	619

STURT PLATEAU PASTORAL DISTRICT

Fire

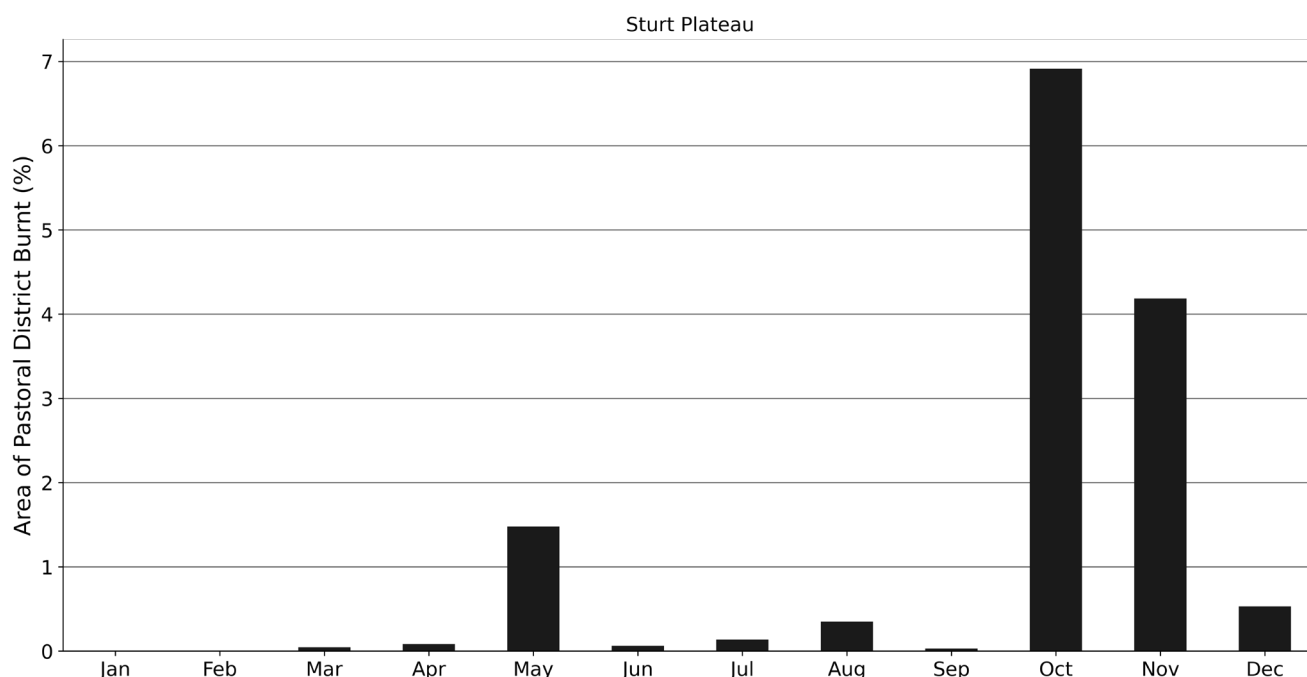


Figure 10. Percentage of the area burnt each month in the Sturt Plateau Pastoral District.

Total vegetation cover and bare ground dynamics

It is important to maintain adequate ground cover in the latter months of each year to minimise soil loss from wind erosion and intense wet-season storms. It is also important to carry dry feed, and associated ground cover, into the latter months of each calendar year in case there is a late start to the usual wet season and/or monsoonal rains fail more generally.

The amount of vegetation present at any location changes from year to year depending on rainfall and its effectiveness, fire history and amount of grazing. The percentage of vegetation in each 30-m square Landsat pixel (900m² or 0.09 ha) was used to report the amount of vegetation cover across all pixels in the Gulf Pastoral District for the end of dry season (September to November Spring composite).

Vegetation cover was above to very-much-above average across most of the Sturt Plateau Pastoral District (Figure 11). Approximately 61% of the District was ranked as above to very much above, 31% was average and 7% was below average. The above average cover across the District is likely to be related to the above average rainfall and the isolated areas of below average cover were associated with the occurrence of fire.

STURT PLATEAU PASTORAL DISTRICT

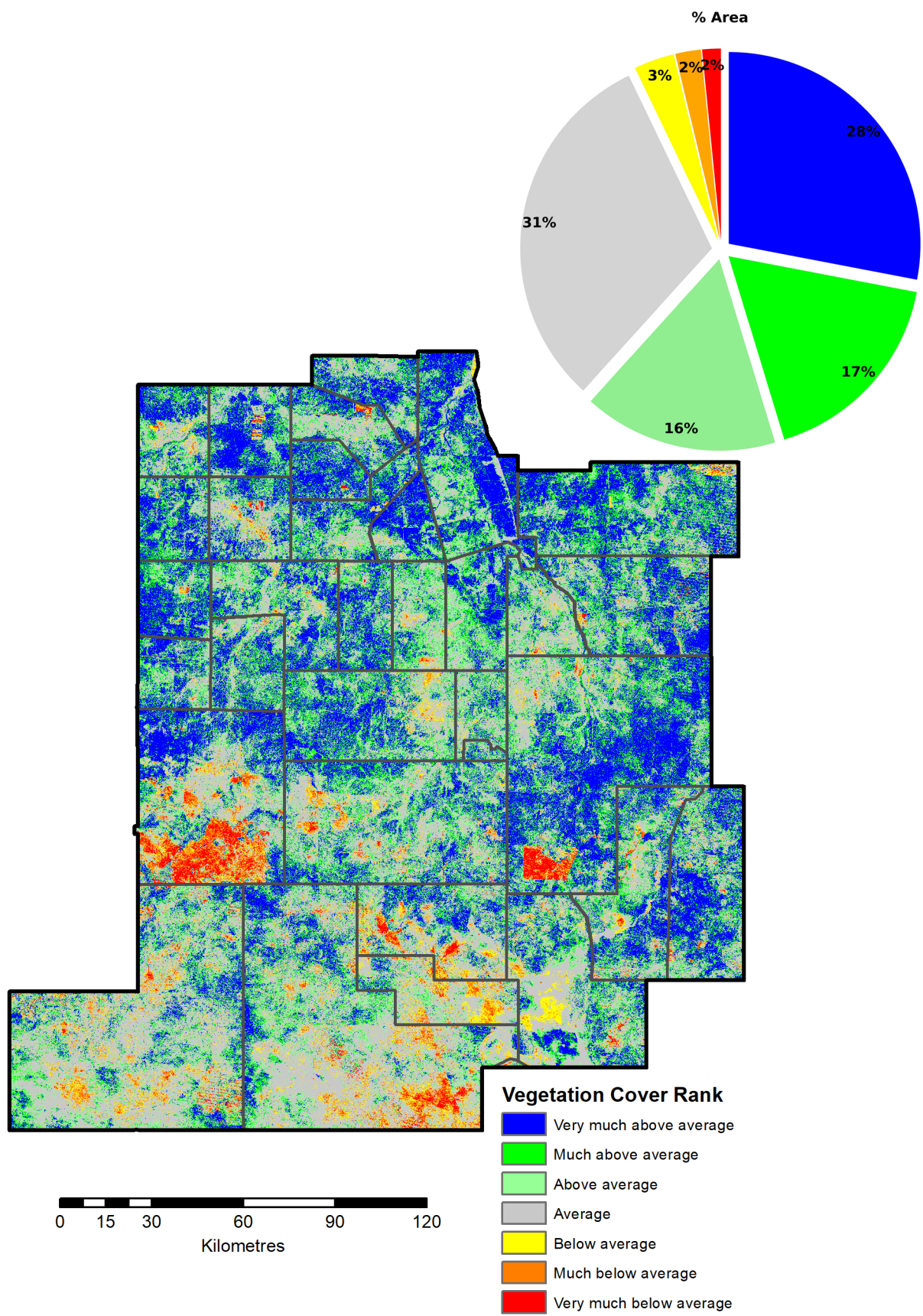


Figure 11. Rank of the amount of remotely sensed vegetation cover present in late 2021 in the Sturt Plateau Pastoral District against previous years back to 1988. Pie chart shows the percentage of area of each vegetation cover rank.

STURT PLATEAU PASTORAL DISTRICT

Site-based monitoring

Two pastoral leases in the Sturt Plateau Pastoral District were visited in 2021 (Table 9). Vegetation cover of the ground layer was measured at 13 sites on these leases.

Vegetation cover was generally good at all sites. Bare ground was generally low at all sites, ranging between 4 and 42%. Perennial and annual grasses dominated vegetation cover while forb cover was extremely low. Litter cover was generally low to moderate.

No monitoring sites were in Excellent condition. Monitoring sites in Good condition all occurred in woodland dominated land systems. This is likely due to the pasture species in these areas being less favoured by cattle and less grazing pressure. These sites had high vegetation cover with healthy and diverse desirable perennial grass species typical of each land system. Undesirable grass and forb species were limited. The bare ground was generally proportionate to the level of utilisation and was considered low. Leaf litter cover was also low.

Monitoring sites in Fair condition occurred in both grassland and woodland land systems. The vegetation cover was low and leaf litter cover was high. At these sites, species composition had changed, with a general decline in desirable perennial grass cover with the replacement by less desirable annual grasses.

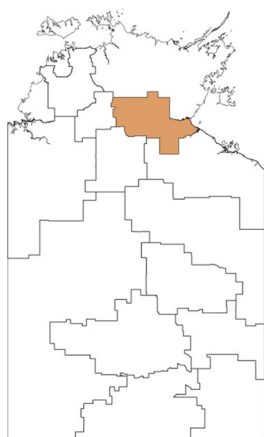
Weeds and erosion issues were generally not observed at any of the monitoring sites.

STURT PLATEAU PASTORAL DISTRICT

Table 9. Summary of land condition assessments in the Sturt Plateau Pastoral District.

Pastoral lease	Land condition rating by sites	Comments on land condition
1	Good: 2 Fair: 2	<p>Overall land condition was assessed as Good, which is consistent with the assessment in 2016.</p> <p>Most of the lease had good vegetation cover and diverse desirable grass species. The bare ground was generally proportionate to the level of utilisation with limited areas having greater than 20% bare ground. The sites in Fair condition displayed disproportionate bare ground, woody thickening or the presence of declared weeds.</p> <p>Hyptis species in medium to large infestations was observed around bores and fence lines.</p> <p>Accelerated and small gully erosion along roads and fence lines was observed.</p> <p>One paddock had a small pocket of wattle thickening.</p> <p>No feral animals were observed.</p> <p>Fires have occurred in most years since 2000. The mean percentage burnt annually is 28% and over 70% of the property burning in 2001 and 2009. Since the last inspection in 2016, approximately 30% of the property has burnt.</p>
2	Good: 3 Fair: 5 Poor: 1	<p>Overall land condition was assessed as Fair, which has declined from the Good rating in 2016.</p> <p>There was a general decline in desirable perennial grass cover, which were replaced by less desirable annual grasses.</p> <p>The woodlands in the north and the west were in better condition than the grasslands. These areas were generally in Good to Fair condition with a dominance of desirable tussock and hummock grass. Some areas displayed a large amount of undesirable perennial grass species and / or high bare ground, which appeared to have had a high frequency of fires in the past 20 years.</p> <p>Prickly acacia, hyptis and rubber bush species were observed.</p> <p>Limited gully erosion was observed.</p> <p>A small, isolated area of wattle woody thickening was observed.</p> <p>Fires have occurred in most years since 2000, with the mean percentage burnt annually being 38%. Over 80% of the property burnt in 2001, 2004 and 2014. Since the last inspection in June 2016, approximately 80% of the property has burnt.</p>

ROPER PASTORAL DISTRICT



The Roper Pastoral District covers 42 000km² over 11 pastoral leases.

Rainfall was average to very-much above average across the Roper Pastoral District. Spatially averaged rainfall for the Roper Pastoral District was well above the long-term median (Table 10).

Vegetation cover in late 2021 was average to very-much-above average, reflecting the high rainfall across the District.

The Roper Pastoral District experienced extensive and frequent fire across the entire District, with 21 500km² burnt between January and December 2021

(Figure 12). Fire was most extensive during November 2021. However, most of the fire activity was not on pastoral leases.

On-ground monitoring of land condition was conducted at 12 sites on three pastoral leases. Vegetation cover was good at all sites, except for one site that was impacted by fire. Bare ground was low and was not considered an issue in the Roper Pastoral District. Perennial and annual grasses dominated vegetation cover and forb cover, while litter cover was generally low. Two sites were in Excellent condition, six in Good and four in Fair condition.

Overall land condition at the two leases inspected during the 2021 monitoring season were rated as either Good or Fair. One lease improved in condition, while the other two leases maintained their overall land condition rating since the previous inspection.

Overall land condition of the three leases inspected in 2021 were rated as Good or Fair. Two leases maintained their overall land condition rating of Fair since the previous inspection and the other lease improved from Fair to Good.

Table 10. Rainfall for the Roper Pastoral District.

Rainfall (mm)

2021	1 152
Long-term median (1900–2020)	772

ROPER PASTORAL DISTRICT

Fire

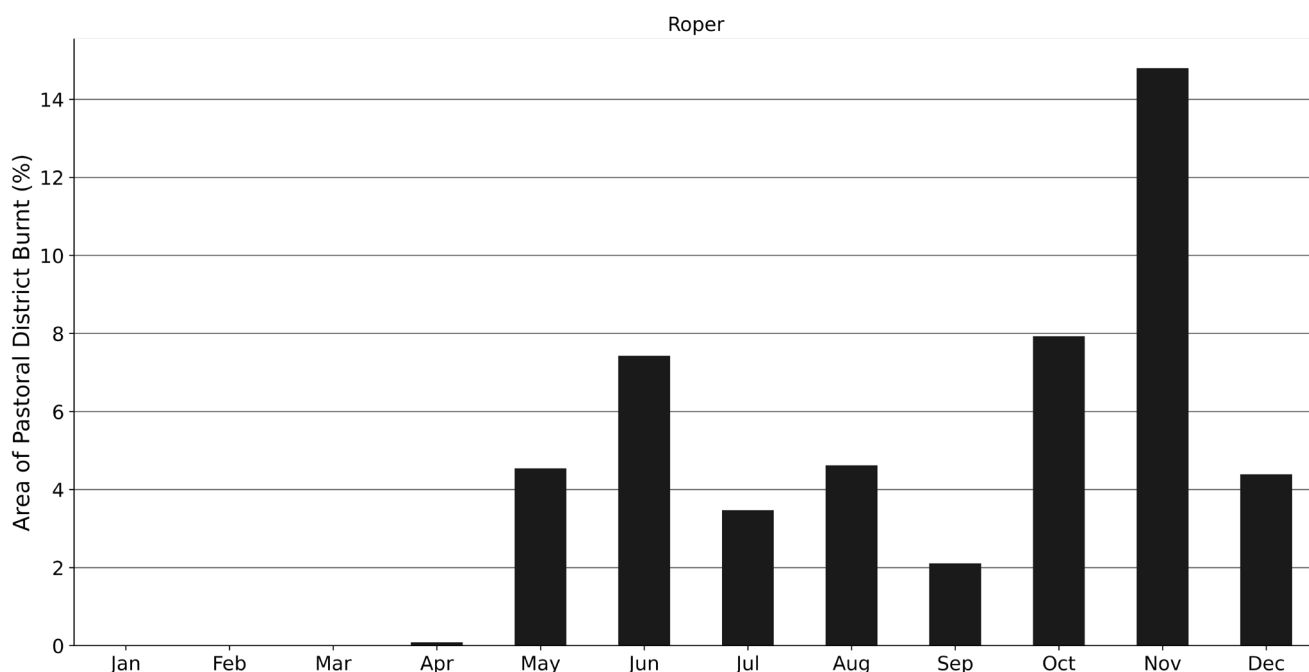


Figure 12. Percentage of the area burnt each month in the Roper Pastoral District.

Total vegetation cover and bare ground dynamics

It is important to maintain adequate ground cover in the latter months of each year to minimise soil loss from wind erosion and intense wet-season storms. It is also important to carry dry feed, and associated ground cover, into the latter months of each calendar year in case there is a late start to the usual wet season and/or monsoonal rains fail more generally.

The amount of vegetation present at any location changes from year to year depending on rainfall and its effectiveness, fire history and amount of grazing. The percentage of vegetation in each 30-m square Landsat pixel (900m² or 0.09 ha) was used to report the amount of vegetation cover across all pixels in the Gulf Pastoral District for the end of dry season (September to November Spring composite).

Vegetation cover was above to very-much-above average across most of the Roper Pastoral District (Figure 13). Approximately 65% of the District was ranked as above to very much above, 28% was average and 9% was below average. The above average cover across the District is likely to be related to the above average rainfall.

ROPER PASTORAL DISTRICT

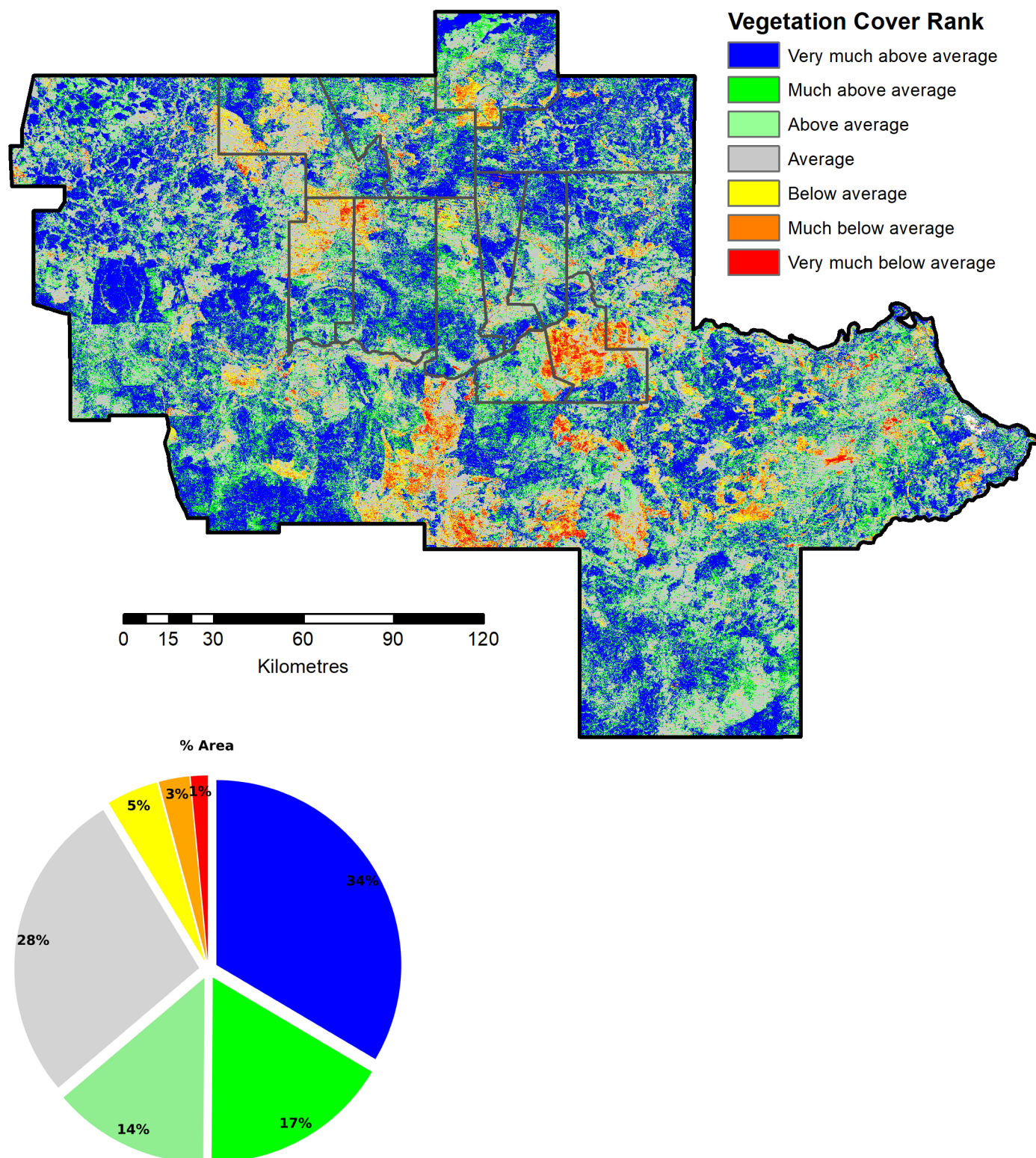


Figure 13. Rank of the amount of remotely sensed vegetation cover present in late 2021 in the Roper Pastoral District against previous years back to 1988. Pie chart shows the percentage of area of each vegetation cover rank.

ROPER PASTORAL DISTRICT

Site-based monitoring

Three pastoral leases in the Roper Pastoral District were visited in 2021 (Table 11). Vegetation cover of the ground layer was measured at 12 sites on these leases.

Vegetation cover was good at all sites. Bare ground was low, ranging between 1 and 19%. One site with 55% bare ground was impacted by fire. Perennial and annual grasses dominated vegetation cover, while forb cover was extremely low. Litter cover was low to moderate.

Monitoring sites considered in Excellent to Good condition had a high vegetation cover that was dominated by a diversity of 3P grasses. Undesirable grass and forb species were limited. Bare ground levels were generally low, as was leaf litter cover. No weed species were observed at these sites.

Monitoring sites in Fair condition had similar levels of vegetation cover, leaf litter cover, and bare ground. Weed species were observed.

No sites were recorded to be in Poor condition.

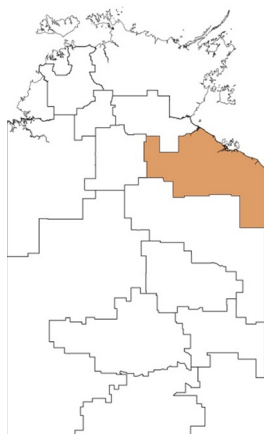
Table 11. Summary of land condition assessments in the Roper Pastoral District.

Pastoral lease	Land condition rating by sites	Comments on land condition
1	Excellent: 2 Good: 1 Fair: 1	<p>Overall land condition was assessed as Good, which has improved from the Fair rating in 2016.</p> <p>There was generally a good diversity with cover of 3P grasses across the property, very high vegetation cover, a good mix of perennial and annual grasses, and bare ground was very low.</p> <p>Grader grass, rubber bush and hyptis species were observed; the infestations ranged from small and isolated to widespread.</p> <p>Diversion banks have been installed across the lease to help reduce active gully erosion, which ranged from moderate to severe erosion.</p> <p>Donkeys and feral pigs were observed.</p> <p>Woody thickening was not observed.</p> <p>Fire has affected the lease since 2000. The mean percentage of the station burnt annually in the past 20 years is 30%. Since the start of 2016 (up until the 2021 inspection), a cumulative 69% of the station has burnt. In the first six months of 2021, less than 2% of the property had burnt.</p>

ROPER PASTORAL DISTRICT

Pastoral lease	Land condition rating by sites	Comments on land condition
2	Good: 2 Fair: 2	<p>Overall land condition was assessed as Fair, which is consistent with the assessment in 2016.</p> <p>Land condition was highly variable, ranging from Excellent to Poor condition. Palatable perennial grasses were present at most sites and annual grass and forb cover was high at some sites. The species composition had declined since 2016 and perennial grasses has been replaced by annuals and forbs.</p> <p>Parkinsonia, grader grass and hyptis were observed.</p> <p>Areas of moderate to severe gully erosion were observed along tracks and fence lines. Diversion banks have been installed to mitigate erosion.</p> <p>Donkeys were observed. The land manager noted that feral buffalos, dogs, donkeys, horses and pigs have been sighted on the property.</p> <p>Fire has affected the lease annually since 2000. The mean percentage of the station burnt annually in the past 20 years is 23%. No fire activity was recorded in 2020 or 2021.</p>
3	Good: 3 Fair: 1	<p>Overall land condition was assessed as Fair, which is consistent with the assessment in 2016.</p> <p>Land condition across the property was low ground cover and the presence of weeds. The lack of 3P grasses can be partially attributed to land systems where 3P grasses are not common. However, fire and historical grazing are likely to have contributed to the current ground cover composition. Vegetation cover was high at most sites.</p> <p>Grader grass, hyptis and rubber bush were observed.</p> <p>Severe to moderate erosion were observed, which are being actively managed.</p> <p>Several donkeys, buffalo and horses were observed.</p> <p>Fire has affected the lease annually since 2000. The mean percentage of the station burnt annually in the past 20 years is 9%. Since the start of 2016, 47% of the property was burnt in 2018 and 2019, with significantly lower fire areas in subsequent years (7% and 4% for 2020 and 2021 respectively).</p>

GULF PASTORAL DISTRICT



The Gulf Pastoral District covers 92 000km² over 16 pastoral leases.

Rainfall was the highest on record for the Gulf Pastoral District. Spatially averaged rainfall for the Gulf Pastoral District was above average when compared with the long-term median (Table 12).

Vegetation cover in late 2021 was average to above average, reflecting the high rainfall across the District. The Gulf Pastoral District experienced sporadic and limited fire, with 26 500km² burnt between January and December 2021 (Figure 14).

On-ground monitoring for land condition was conducted on 18 sites on five pastoral leases. Vegetation cover was generally good at all sites. Bare ground was low and was not considered an issue in this District. Perennial and annual grasses dominated vegetation cover, while forb cover was exceptionally low. Litter cover was also low.

Overall land condition at all five leases inspected in 2021 were rated as Good or Fair. Two leases improved from Fair to Good, two maintained a Fair rating and one declined from Good to Fair.

Table 12. Rainfall for the Gulf Pastoral District.

Rainfall (mm)	
2021	851
Long-term median (1900–2020)	657

GULF PASTORAL DISTRICT

Fire

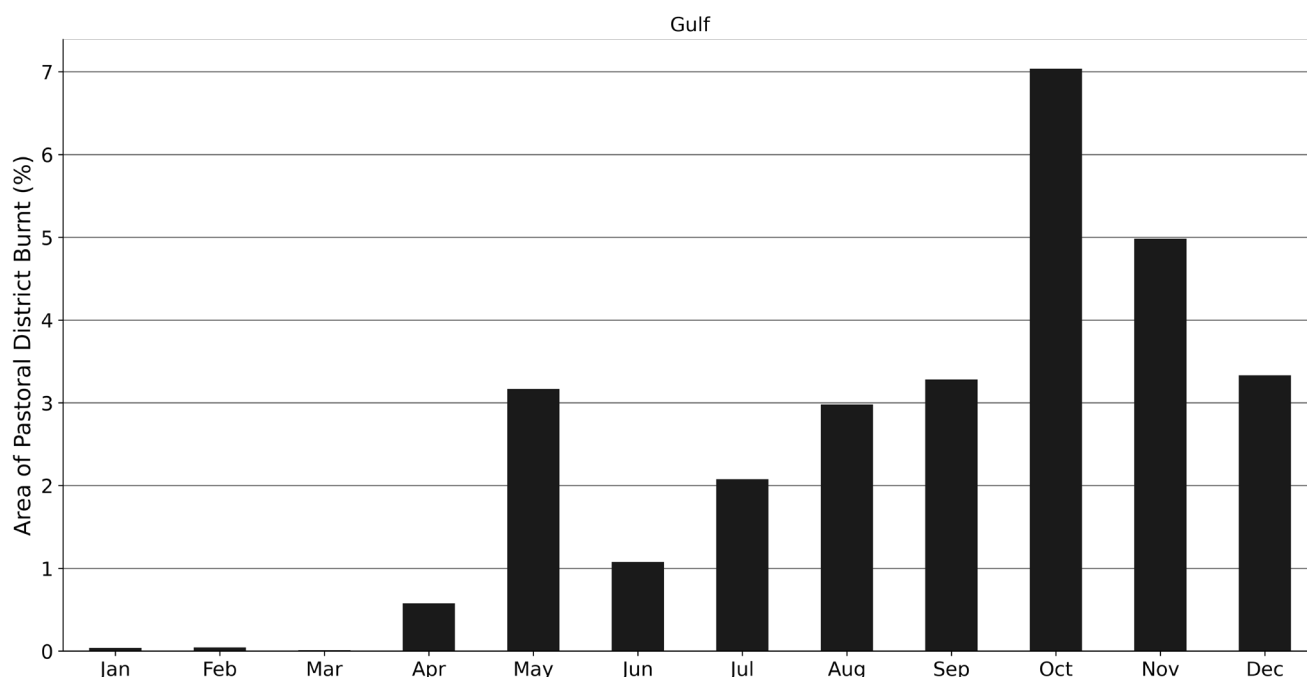


Figure 14. Percentage of the area burnt each month in the Gulf Pastoral District.

Total vegetation cover and bare ground dynamics

It is important to maintain adequate ground cover in the latter months of each year to minimise soil loss from wind erosion and intense wet-season storms. It is also important to carry dry feed, and associated ground cover, into the latter months of each calendar year in case there is a late start to the wet season and/or monsoonal rains fail more generally.

The amount of vegetation present at any location changes from year to year depending on rainfall and its effectiveness, fire history and amount of grazing. The percentage of vegetation in each 30-m square Landsat pixel (900m² or 0.09 ha) was used to report the amount of vegetation cover across all pixels in the Gulf Pastoral District for the end of dry season (September to November Spring composite).

Vegetation cover was average to above average across most of the Gulf Pastoral District (Figure 15). Approximately 29% of the District was ranked as average and 62% was above to very-much-above average. Only 10% of the District had below average cover and these areas were generally correlated with late dry season fires.

GULF PASTORAL DISTRICT

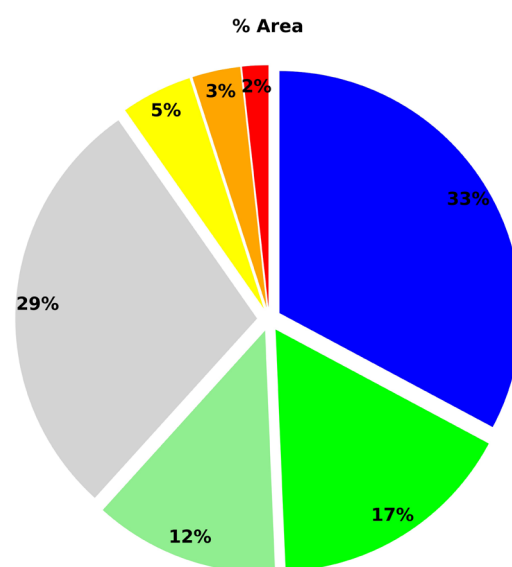
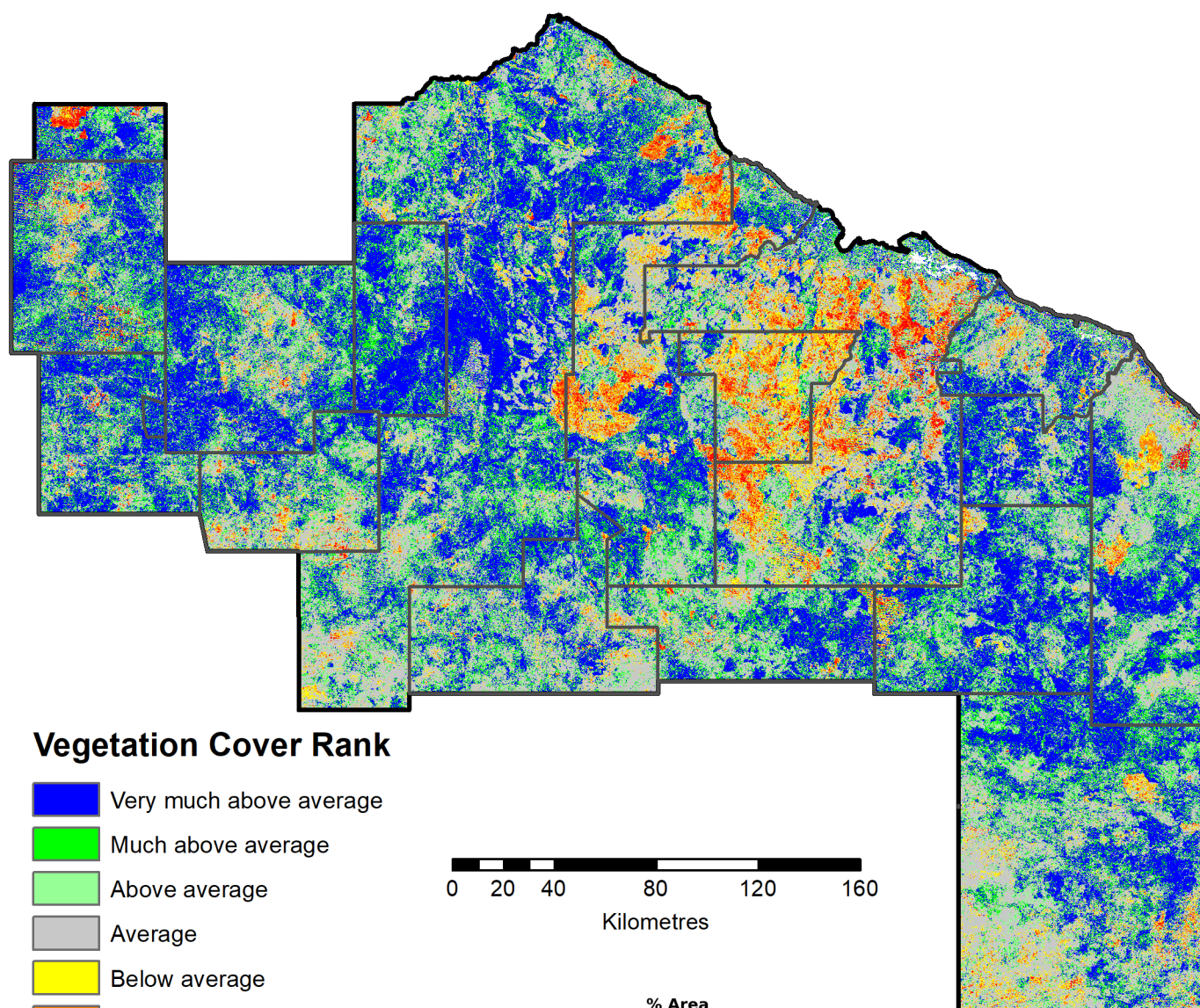


Figure 15. Rank of the amount of remotely sensed vegetation cover present in late 2021 in the Gulf Pastoral District against previous years back to 1988. Pie chart shows the percentage of area of each vegetation cover rank.

GULF PASTORAL DISTRICT

Site-based monitoring

Five pastoral leases in the Gulf Pastoral District were visited in 2021 (Table 13). Vegetation cover of the ground layer was measured at 18 sites on these leases.

Vegetation cover was generally good at all sites. Bare ground was low, ranging between 1 and 41%. Perennial and annual grasses dominated vegetation cover, while forb cover was extremely low. Litter cover was also generally low.

Woodland land systems dominated the leases that were monitored in the Gulf District. Monitoring sites in Excellent to Good condition had a very high vegetation cover, with this cover mostly being dominated by perennial grasses, and to a lesser extent annual grasses. 3P (palatable, perennial and productive) grasses were present. However, the diversity of these species was low, with often only a couple of species occurring. Forbs had a very low cover and leaf litter cover was low.

Monitoring sites in Fair to Poor condition had a lower vegetation cover and both litter cover and bare ground were higher. While perennial grasses were still present at these sites, they were in much lower density.

Weeds and erosion issues were generally not observed at any of the monitoring sites.

Table 13. Summary of land condition assessments in the Gulf Pastoral District.

Pastoral lease	Land condition rating by sites	Comments on land condition
1	Good: 3 Fair: 1	<p>Overall land condition was assessed as Fair, which has declined from the Good rating in 2016.</p> <p>Land condition was highly variable. The limited bare ground was desirable, although there had been a general decrease in perennial grass cover across the property and an increased presence of unpalatable forbs. Paddocks inspected were in Good and Fair condition, with some highly utilised paddocks observed in Poor condition.</p> <p>Noogoora burr and hyptis species were observed with weed species such as Parthenium and gamba grass documented.</p> <p>Gully erosion was observed. Newly created roads had been constructed with whoa-boys to divert water away from the road. A majority of roads are no longer being used. Due to the good wet season, woody thickening in some areas of the lease were identified.</p> <p>The lease experienced fires in the majority of years since 2000 and the annual mean percentage of the property burnt since 2000 is 28%. In 2012, nearly 90% of the property was burnt with the last fire occurring in December 2018. Since the last inspection in October 2016, approximately a quarter of the property has burnt.</p>

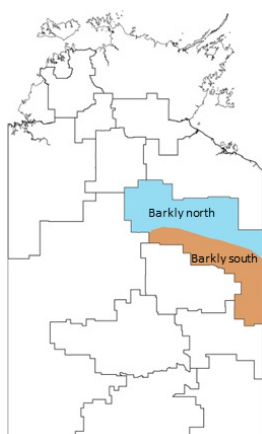
GULF PASTORAL DISTRICT

Pastoral lease	Land condition rating by sites	Comments on land condition
2	Excellent: 2 Good: 2	<p>Overall land condition was assessed as Good, which has improved from the Fair rating in 2016.</p> <p>The increase is likely due to the above average wet season in 2020–21 and limited number of cattle on the property. Vegetation cover was high, with bare ground extremely low and a variable observation of 3P grasses.</p> <p>One class A weed; bellyache bush, and two class B weeds; neem and hyptis were observed. Hyptis appeared too widespread to be adequately and economically treated.</p> <p>Minimal, low concern instances of gully erosion observed and no instances of woody thickening identified in the inspected accessible areas.</p> <p>Horses and wild dogs were observed on the property.</p> <p>Wildfire has affected the lease annually since 2000 and the annual mean percentage of the property burnt since 2000 is 31%. Fire activity peaked in 2019, with 57% of the property burnt. Since the start of 2018 (up until the 2021 inspection), a cumulative 57% of the lease burnt.</p>
3	Fair: 2 Poor:1	<p>Overall land condition was assessed as Fair, which is consistent with the assessment in 2016.</p> <p>The rating reflects lack of visible 3P grass species, however vegetation cover is good at most sites except for upland and rocky sites with naturally lower levels of cover.</p> <p>Hyptis and parkinsonia were recorded. Hyptis appeared widely distributed and parkinsonia occurred along the major river through the property. Both species have active control programs in place.</p> <p>No feral animals were observed on the property. An annual aerial shooting program saw 500 horses and 100 pigs removed in 2019 and a further 350 horses and 100 pigs removed in 2020.</p> <p>No erosion was observed during the inspection due to current prevention controls in place. Burning is being used to control woody thickening, which aims to reduce tree seedling density, by 30–35% each season.</p> <p>Fire is managed with early dry season burning using a storm-burning program. The program aims to retain the humus layer, reduce tree seedlings and target weeds sensitive to fire. Imagery shows patches of fire across the Lease over the past 10 years, with few large, wide spread fires occurring due to the storm-burning program.</p>

GULF PASTORAL DISTRICT

Pastoral lease	Land condition rating by sites	Comments on land condition
4	Fair: 3 Poor: 1	<p>Overall land condition was assessed as Fair, which is consistent with the assessment in 2016.</p> <p>In areas where cattle production was more heavily focused, black spear grass dominated. Vegetation cover within the lease was good however; 3P grass diversity remained consistently low. This is likely due to natural species composition within the area and the long-term grazing history. The dominance of less-palatable grass species can be of concern in respect to cattle production.</p> <p>Hyptis was observed widespread throughout the property where cattle were held.</p> <p>Wild horses were observed.</p> <p>Erosion recorded at several locations with minor gullyng on tracks.</p> <p>Due to the location along the coastal land system, a very low frequency of fires have occurred and the annual mean percentage of the property burnt since 2000 is 24%, ranging from 5% of the property burnt in 2013, 2014 and 2021 to 58% in 2001. In most years less than 20% of the property burnt; with more wide spread burning (>40% property burnt) occurring semi-regularly. Managed storm burning is undertaken in conjunction with the neighbouring lease.</p>
5	Excellent: 1 Good: 2	<p>Overall land condition was assessed as Good, which has improved from the Fair rating in 2016.</p> <p>Improvement is likely due to the exceptional 2020–21 wet season, which increased pasture growth across the property. Additionally, due to the limited number of cattle on the property, grazing pressure was minimal. Access across the lease was limited by the poor condition of the tracks due to limited track maintenance.</p> <p>Hyptis observed in one location within the lease.</p> <p>Feral horses observed and pigs, donkeys, cats also identified as being present. No formal feral animal management practices undertaken, however recreational hunting occurs on the property.</p> <p>No signs of erosion or woody thickening were observed.</p> <p>Wildfire has affected the Lease annually since 2000. The annual mean percentage of the property burnt since 2000 is at a moderate 30%. Since the start of 2018 (up until the 2021 inspection), 36% of the lease had burnt.</p>

BARKLY PASTORAL DISTRICT



The Barkly Pastoral District covers 134 000km² over 32 pastoral leases.

Rainfall was average across the Barkly Pastoral District. Spatially averaged rainfall was slightly above the long-term median for the north and slightly below for the south (Table 14).

Vegetation cover in late 2021 was average; approximately 23% of the District recorded above average and 27% recorded below average vegetation cover.

The Barkly Pastoral District had low fire activity between January and December 2021 (Figure 16), with less than 1% of the District impacted by fire.

On-ground monitoring for land condition was conducted on 19 sites on two pastoral leases. Vegetation cover was generally good at all sites. Bare ground was low and was not considered an issue in this District. Five sites were in Good condition, five in Fair and nine in Poor condition.

The land condition rating of the only two pastoral leases monitored in the Barkly Pastoral District in 2021 declined from Good to Fair and the other from Good/Fair to Poor.

Table 14. Rainfall for the Barkly Pastoral District.

Rainfall (mm)		
2021	428	299
Long-term median (1900–2020)	415	319

BARKLY PASTORAL DISTRICT

Fire

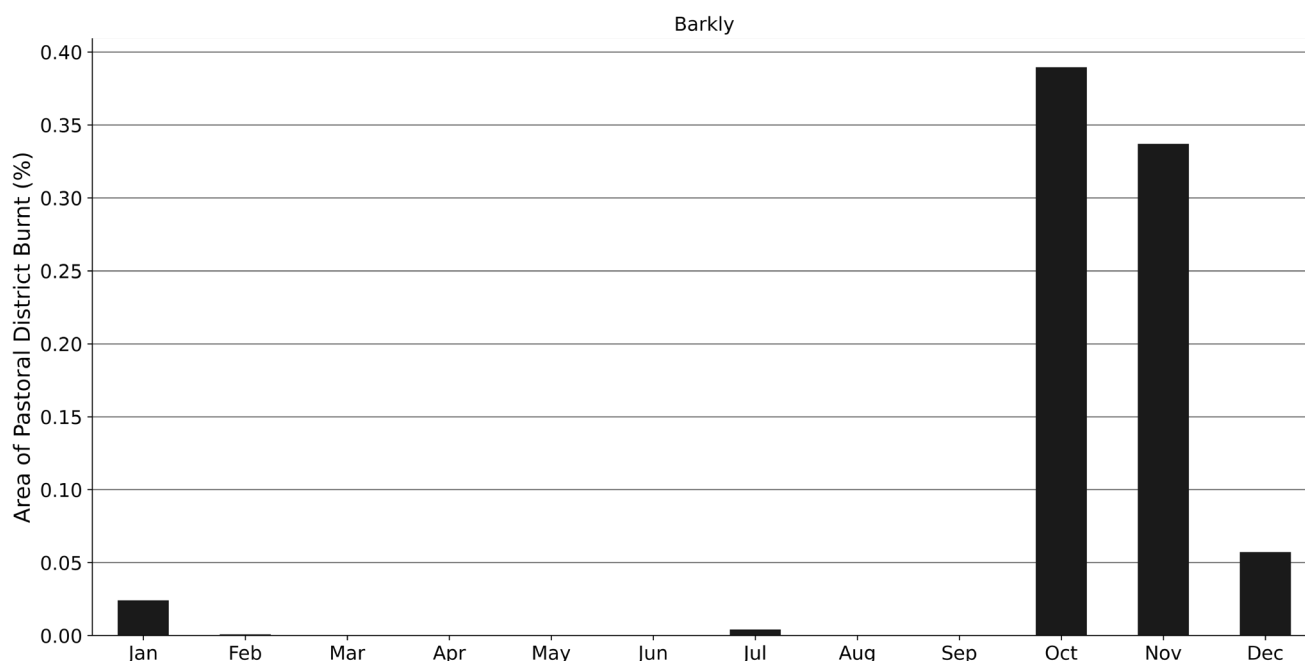


Figure 16. Percentage of the area burnt each month in the Barkly Pastoral District.

Total vegetation cover and bare ground dynamics

It is important to maintain adequate ground cover in the latter months of each year to minimise soil loss from wind erosion and intense summer storms. It is also important to carry dry feed, and associated ground cover, into the latter months of each calendar year in case there is a late start to the usual wet season and/or monsoonal rains fail more generally.

The amount of vegetation present at any location changes from year to year depending on rainfall and its effectiveness, fire history and amount of grazing. The percentage of vegetation in each 30-m square Landsat pixel (900m² or 0.09 ha) was used to report the amount of vegetation cover across all pixels in the Barkly Pastoral District for the end of dry season (September to November Spring composite).

Vegetation cover was average across the Barkly Pastoral District (Figure 17). Approximately 27% of the District was below average, largely to the south. Approximately 23% of the District recorded above average vegetation cover, which was largely concentrated to the north.

BARKLY PASTORAL DISTRICT

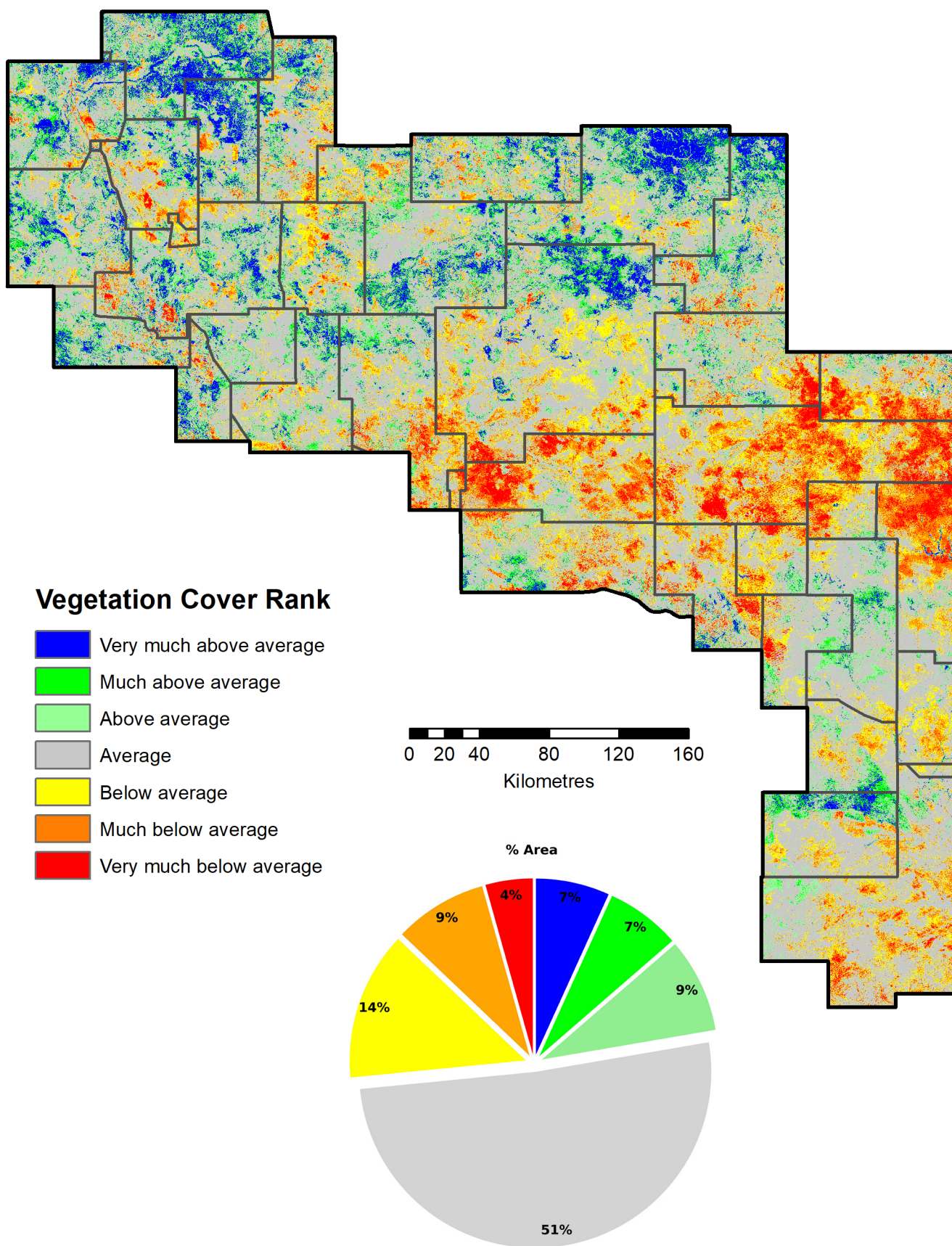


Figure 17. Rank of the amount of remotely sensed vegetation cover present in late 2021 in the Barkly Pastoral District against previous years back to 1988. Pie chart shows the percentage of area of each vegetation cover rank.

BARKLY PASTORAL DISTRICT

Site-based monitoring

Two pastoral leases in the Barkly Pastoral District were visited in 2021 (Table 15). Vegetation cover of the ground layer was measured at 19 sites on these leases.

Vegetation cover was generally good at all sites. Bare ground was generally low, ranging between 1 and 57%. Perennial and annual grasses dominated vegetation cover, while forb cover was extremely low. Litter cover was also generally low.

No monitoring sites were in Excellent condition. Monitoring sites in Good condition all occurred in woodland dominated land systems. This is likely due to the pasture species in these areas being less favoured by cattle and limited grazing pressure. These sites had high vegetation cover with a very high proportion of perennial grasses. A diversity of 3P grass species were common at these sites. Forbs were extremely low and leaf litter cover was low.

Monitoring sites in Fair to Poor condition occurred in the grassland land systems. The vegetation cover, leaf litter cover and bare ground were at very similar levels. The recorded difference at these sites was the species composition. The proportion of perennial grasses to annual grasses had almost swapped around from the Good condition sites, to where the annual grasses were dominant and the perennial grasses were still present, but far less common. 3P grass tussocks were often less robust and grazed more heavily, and in some cases were in extremely low numbers.

Overall land condition at the two leases inspected during the 2021 monitoring season were rated as either Fair or Poor. Both leases declined in their land condition rating since the previous inspection.

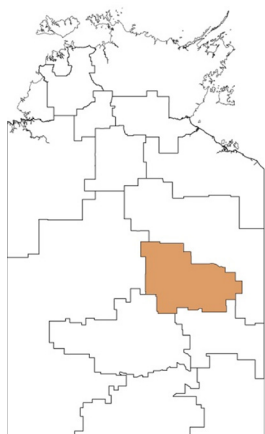
Weeds and erosion issues were generally not observed at any monitoring sites.

BARKLY PASTORAL DISTRICT

Table 15. Summary of land condition assessments in the Barkly Pastoral District.

Pastoral lease	Land condition rating by sites	Comments on land condition
1	Good: 1 Fair: 3 Poor: 3	<p>Overall land condition was assessed as Fair, which has declined from the Good rating in 2016.</p> <p>Land condition was highly variable. The less-developed wooded areas in the north and east were in Good to Fair condition, while the more productive tussock grasslands in the south were in Fair to Poor condition. The grassland areas exhibited a general decline in desirable perennial grass cover with the replacement of less-desirable annual grasses.</p> <p>Two class A weeds, athel pine, mesquite and one class B weed, parkinsonia were observed.</p> <p>No feral animals or woody thickening observed.</p> <p>Minimal erosion observed.</p> <p>The annual mean percentage of the property burnt since 2000 is 16%, with more than half the property being burnt in 2001, 2004, 2007 and 2012 due to good wet seasons producing high fuel loads. Following a number of recent poor wet seasons, the lease last experienced fire in January 2020 with only 102km² being burnt. Since the last inspection in May 2016, under a quarter of the property has been burnt.</p>
2	Good: 5 Fair: 5 Poor: 9	<p>Overall land condition was assessed as Poor, which has declined from the Good to Fair rating in 2018.</p> <p>Land condition was highly variable. The majority of woodland and coolibah country was in Good to Fair condition while the more productive tussock grasslands in Fair to Poor condition. Grassland areas exhibited a general decrease in desirable perennial grass cover with the replacement by less-desirable annual grasses.</p> <p>One class B weed, parkinsonia observed during inspection with weed control strategies implemented.</p> <p>Gully erosion observed, and previously used roads becoming washouts.</p> <p>The last fire occurred in March 2019. Due to a number of recent poor wet seasons and since the 2018 inspection just over 2% of the property had burnt. The annual mean percentage of the property burnt since 2000 is 10%, with the largest area burnt (>50%) occurring in 2004. Fire activity in this year followed high rainfall, which subsequently produced high fuel loads.</p>

TENNANT CREEK PASTORAL DISTRICT



The Tennant Creek Pastoral District covers 69 200km² over eight pastoral leases.

Rainfall was average across the Tennant Creek Pastoral District. Spatially averaged rainfall for the Tennant Creek Pastoral District also corresponded with the long-term median (Table 16).

Vegetation cover in late 2021 was varied across the District. Approximately 50% of the District had average levels of vegetation cover and the remainder of the District was above or below the average.

The Tennant Creek Pastoral District had very low fire activity between January and December 2021 (Figure 18), with less than 1.5% of the District impacted by fire. There were no records of fire on pastoral leases in the Tennant Creek Pastoral District in 2021.

On-ground monitoring of land condition was conducted at 20 sites on three pastoral leases. Vegetation cover was generally low. Bare ground ranged from moderate to high. The productive areas lacked 3P grass cover and diversity and had very low perennial grass cover. Annual grass cover was also generally low and forb cover often very low or non-existent. Less productive areas tended to have much higher perennial and annual grass cover, although 3P grasses were generally still low in cover. Forb cover was higher in these areas and bare ground was significantly lower. One site was in Excellent condition, two in Good, 12 in Fair and five in Poor condition.

Overall land condition at all three leases inspected during 2021 were rated as Fair. Two leases maintained a Fair rating and the other lease transitioned to a single rating (i.e. Good/Fair to Fair).

Table 16. Rainfall statistics for the Tennant Creek Pastoral District.

Rainfall (mm)

2021	295
Long-term median (1900–2020)	283

TENNANT CREEK PASTORAL DISTRICT

Fire

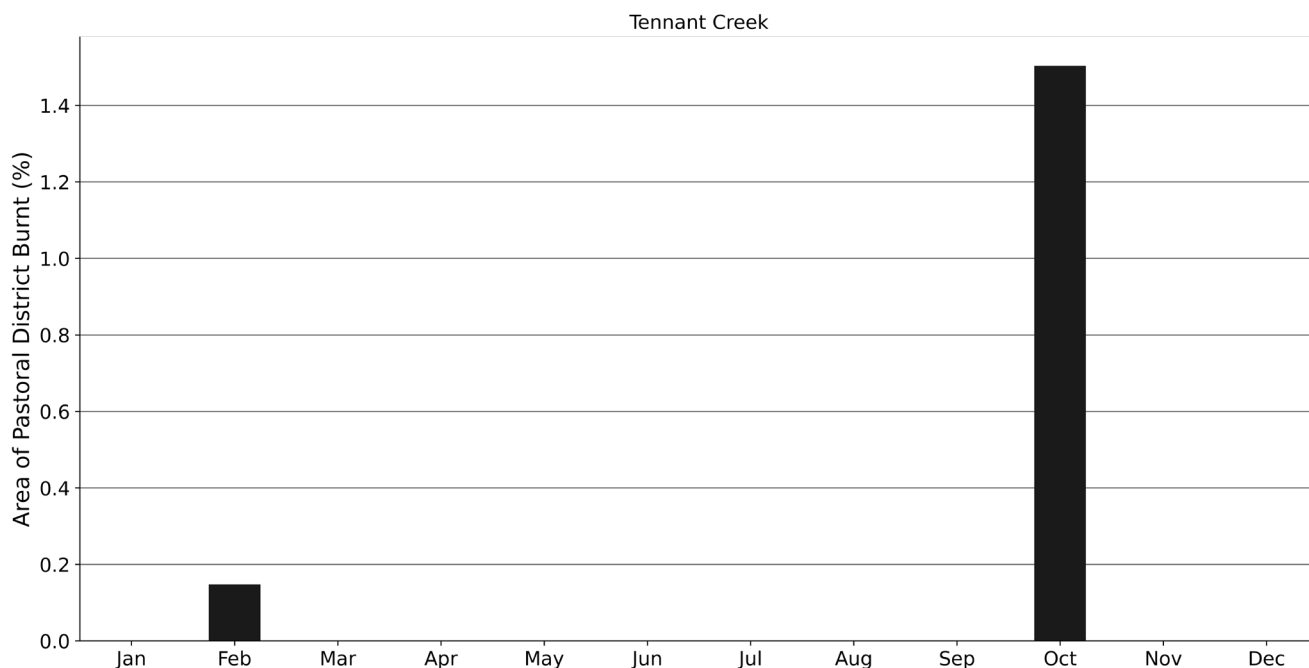


Figure 18. Percentage of the area burnt each month in the Tennant Creek Pastoral District.

Total vegetation cover and bare ground dynamics

It is important to maintain adequate ground cover in the latter months of each year to minimise soil loss from wind erosion and intense summer storms. It is also important to carry dry feed, and associated ground cover, into the latter months of each calendar year in case there is a late start to the usual Wet season and/or summer rains fail more generally.

The amount of vegetation present at any location changes from year to year depending on rainfall and its effectiveness, fire history and amount of grazing. The percentage of vegetation in each 30m square Landsat pixel (900m² or 0.09 ha) was used to report the amount of vegetation cover across all pixels in the Tennant Creek Pastoral District for the end of dry season (September to November Spring composite).

Vegetation cover was average across the Tennant Creek Pastoral District (Figure 19). Approximately 20% of the District was below average and most of the remainder of the District recorded above average vegetation cover.

TENNANT CREEK PASTORAL DISTRICT

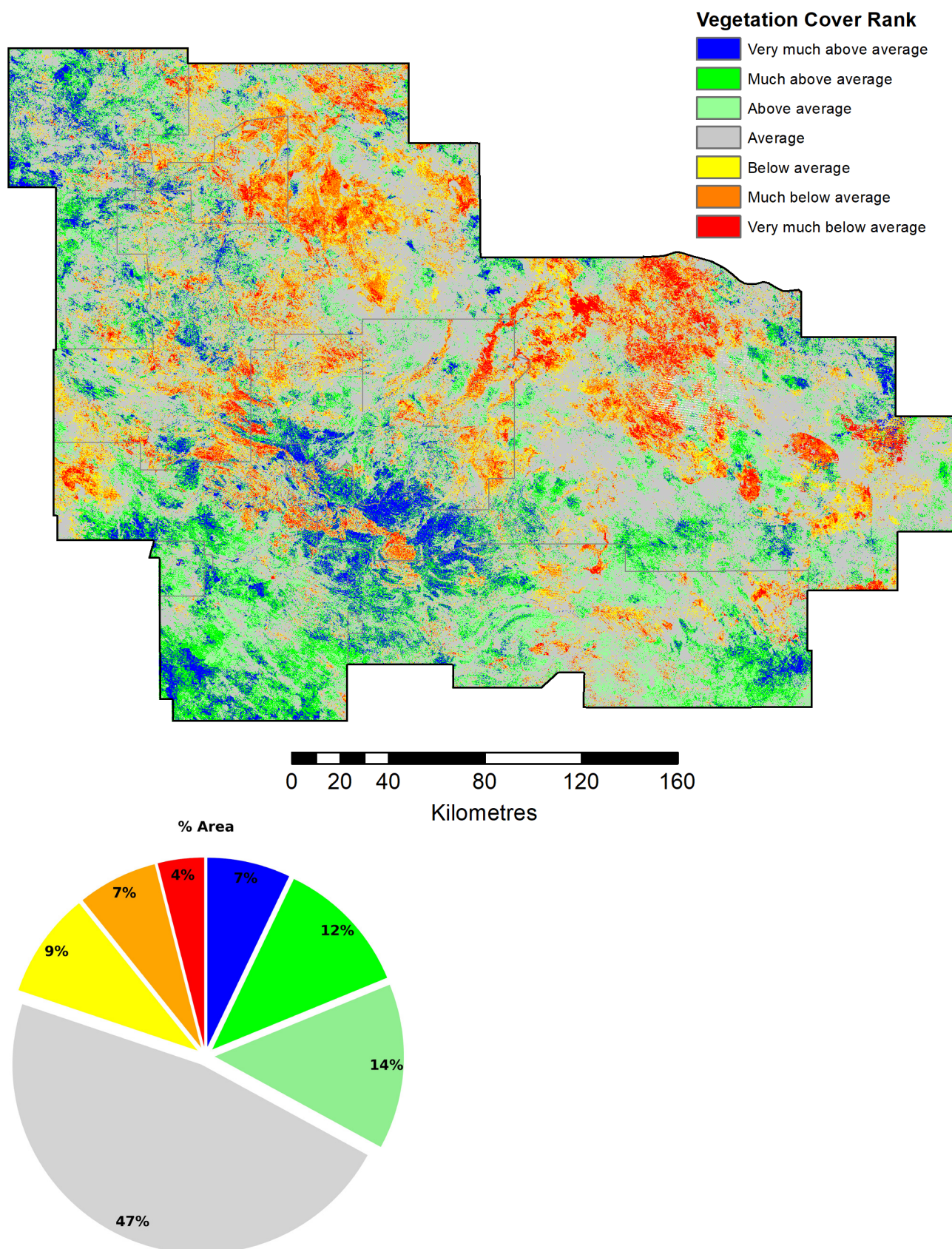


Figure 19. Rank of the amount of remotely sensed vegetation cover present in late 2021 in the Tennant Creek Pastoral District against previous years back to 1988. Pie chart shows the percentage of area of each vegetation cover rank.

TENNANT CREEK PASTORAL DISTRICT

Site-based monitoring

Three pastoral leases in the Tennant Creek Pastoral District were visited in 2021 (Table 17). Vegetation cover of the ground layer was measured at 20 sites on these leases.

Vegetation cover was generally low. Bare ground was moderate to high, with some sites being above 50% bare ground. Bare ground in the Fair to Poor condition sites was almost double that recorded in the Excellent to Good condition sites.

Species composition of the vegetation varied. Productive areas tended to have higher levels of grazing pressure and lacked 3P grass cover and diversity. Most of these sites had very low perennial grass cover. Annual grass cover was also low and forb cover very low or non-existent. Monitoring sites in Fair to Poor condition tended to coincide with these areas.

Less pastorally productive areas have over time experienced lower grazing pressure and consequently these land systems were generally intact. These sites tended to have much higher perennial and annual grass cover. However, 3P grasses were generally still low in cover. Forb cover was higher in these areas and bare ground was significantly lower. Monitoring sites in Excellent to Good condition tended to coincide with these areas.

Weeds and areas of erosion were not an issue at any of the monitoring sites.

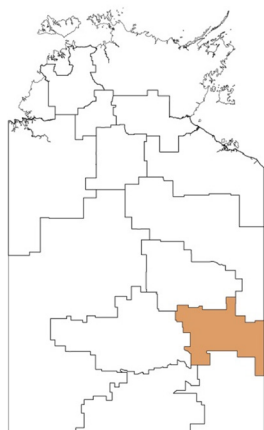
Table 17. Summary of land condition assessments in the Tennant Creek Pastoral District.

Pastoral lease	Land condition rating by sites	Comments on land condition
1	Excellent: 1 Good: 1 Fair: 7	<p>Overall land condition was assessed as Fair, which is consistent with the assessment in 2016.</p> <p>The land condition was highly variable in 2021. Less pastorally productive areas observed in better condition than heavily utilised areas. 3P grass cover was generally low across the property, while bare ground was at moderate levels.</p> <p>No weeds were observed; however, parkinsonia was observed during a previous visit and is being actively controlled by station management.</p> <p>Erosion observed and managed with construction of whoa-boys. Scalding present around yard and bores.</p> <p>No woody thickening or feral animals observed.</p> <p>Wildfire has affected the property in five of the past ten years. The mean percentage of the station burnt annually since 2000 is 8% with the worst fire year being 2011 where 78% of the station was burnt due to high fuel loads from higher than average rainfall in 2010/11. There were no fires in 2021 prior to the inspection and 8% of the property has burnt since the previous inspection in May 2016.</p>

TENNANT CREEK PASTORAL DISTRICT

Pastoral lease	Land condition rating by sites	Comments on land condition
2	Fair: 4 Poor: 3	<p>Overall land condition was assessed as Fair, which has transitioned to a declined single rating from the Good/Fair rating in 2016.</p> <p>Land condition displayed general decline in vegetation cover and an increase in bare ground. 3P grasses and perennial grass cover has declined at monitoring sites and across the property, particularly in the more pastorally productive areas.</p> <p>No weed species were observed on the property. Management is ongoing for small populations of parkinsonia along creek lines.</p> <p>Deep gullyng of old roads observed. Active eroding sites were continuing to encroach on utilised roads, some showing evidence of rehabilitation attempts currently in place.</p> <p>No areas of woody thickening or feral animals were observed.</p> <p>Fire data indicates three major periods of fire activity on this pastoral lease since 2000, 2001, 2002 and 2011. The mean percentage of the station burnt annually since 2000 is 13%. Burning over two consecutive years (2001 and 2002) resulted in the majority of the property experiencing fire, leaving few areas remaining unburnt. Fire activity in 2011 re-burnt a large extent of the same areas as burnt in 2001-02, leading to the highest percentage of area burnt in one calendar year at 57%.</p>
3	Good: 1 Fair: 1 Poor: 2	<p>Overall land condition was assessed as Fair, which is consistent with the assessment in 2016.</p> <p>The main grazing area of the property was in Poor to Fair condition but had shown improvement since the previous inspection in 2016. Several areas that are generally underutilised due to the lack of palatable pastures and are in Good condition.</p> <p>Two Class B declared weeds, parkinsonia and rubber bush were observed.</p> <p>Major areas of gullyng occur along the barer and sloped areas of one of the main creek lines. Historical erosion due to the lack of cover has the potential to expand with heavier rainfall in the future. Tracks appear developed with erosion controls however not all have been successful.</p> <p>No feral animals were observed during the current inspection, and one area of wattle woody thickening was observed.</p> <p>Fire scar data indicates that this pastoral lease has experienced fires sporadically since 2000. The mean percentage of the station burnt annually in the past 20 years is 10% with the worst fire year being 2011 where 79% burnt due to high fuel loads from the two preceding good wet seasons. A number of fires in 2011 burnt around 80% of the property with all areas being affected. There were no fires in 2020 or 2021 prior to the inspection. Since the last inspection in July 2016, less than half of the property has burnt with 2017 accounting for 57% of that area.</p>

PLENTY PASTORAL DISTRICT



The Plenty Pastoral District covers 52 000km² over 14 pastoral leases.

Rainfall was average across the Plenty Pastoral District. Spatially averaged rainfall for the Plenty Pastoral District was above the long-term median (Table 18).

Vegetation cover in late 2021 was varied across the District. Approximately 57% of the District had average levels of vegetation cover and the remainder of the District was above or below the average.

The Plenty Pastoral District had very low fire activity between January and December 2021 (Figure 20), with only 0.13% of the District impacted by a single fire event in the south in October 2021.

On-ground monitoring for land condition was conducted at 20 sites on two pastoral leases. Vegetation cover was generally low. Bare ground was moderate to high, with the average bare ground recorded above 60%. Monitoring sites in Good condition had moderate perennial and annual grass cover and bare ground. Perennial grasses, particularly buffel grass, dominated the vegetation cover and forbs had an extremely low cover.

Monitoring sites in Fair to Poor condition had a lower vegetation cover and perennial grass cover was low. Annual grass cover was also low and forb cover had increased at these sites. Bare ground cover at these sites was high, averaging over 65%. 3P grass species were not common and had been replaced by lower value grasses, forbs and bare ground. Four of the sites were in Good condition, nine in Fair condition and seven sites were in Poor condition.

Overall land condition at all two leases inspected during 2021 were rated as Fair. The leases both transitioned to a single rating (i.e. Good/Fair to Fair and Good/Poor to Fair).

Table 18. Rainfall for the Plenty Pastoral District.

Rainfall (mm)	
2021	244
Long-term median (1900–2020)	198

PLENTY PASTORAL DISTRICT

Fire

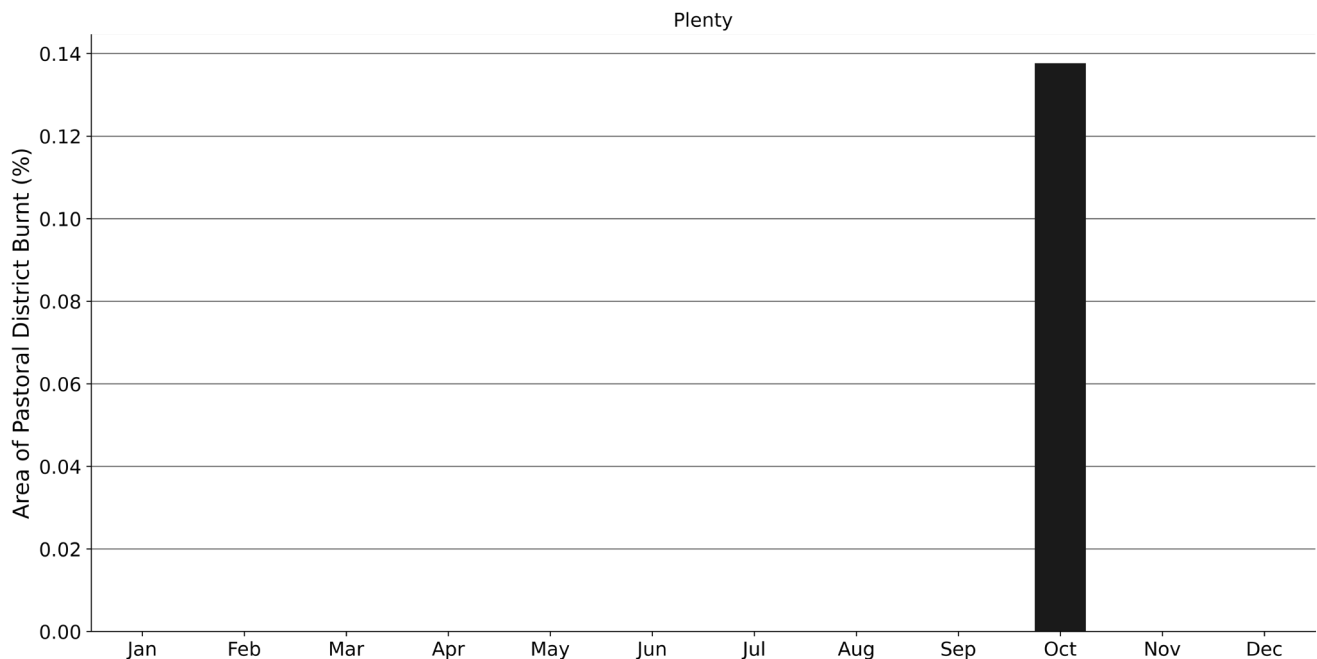


Figure 20. Percentage of the area burnt each month in the Plenty Pastoral District.

Total vegetation cover and bare ground dynamics

It is important to maintain adequate ground cover in the latter months of each year to minimise soil loss from wind erosion and intense summer storms. The highly variable nature of rainfall in the southern NT also means that it is necessary to carry dry feed, and associated ground cover, into the hotter months in case summer rains fail.

The amount of vegetation present at any location changes from year to year depending on rainfall and its effectiveness, fire history and amount of grazing. The percentage of vegetation in each 30m square Landsat pixel (900m² or 0.09 ha) was used to report the amount of vegetation cover across all pixels in the Plenty Pastoral District for the end of dry season (September to November Spring composite).

Vegetation cover was average across the Plenty Pastoral District (Figure 21). Approximately 60% of the District was average.

PLENTY PASTORAL DISTRICT

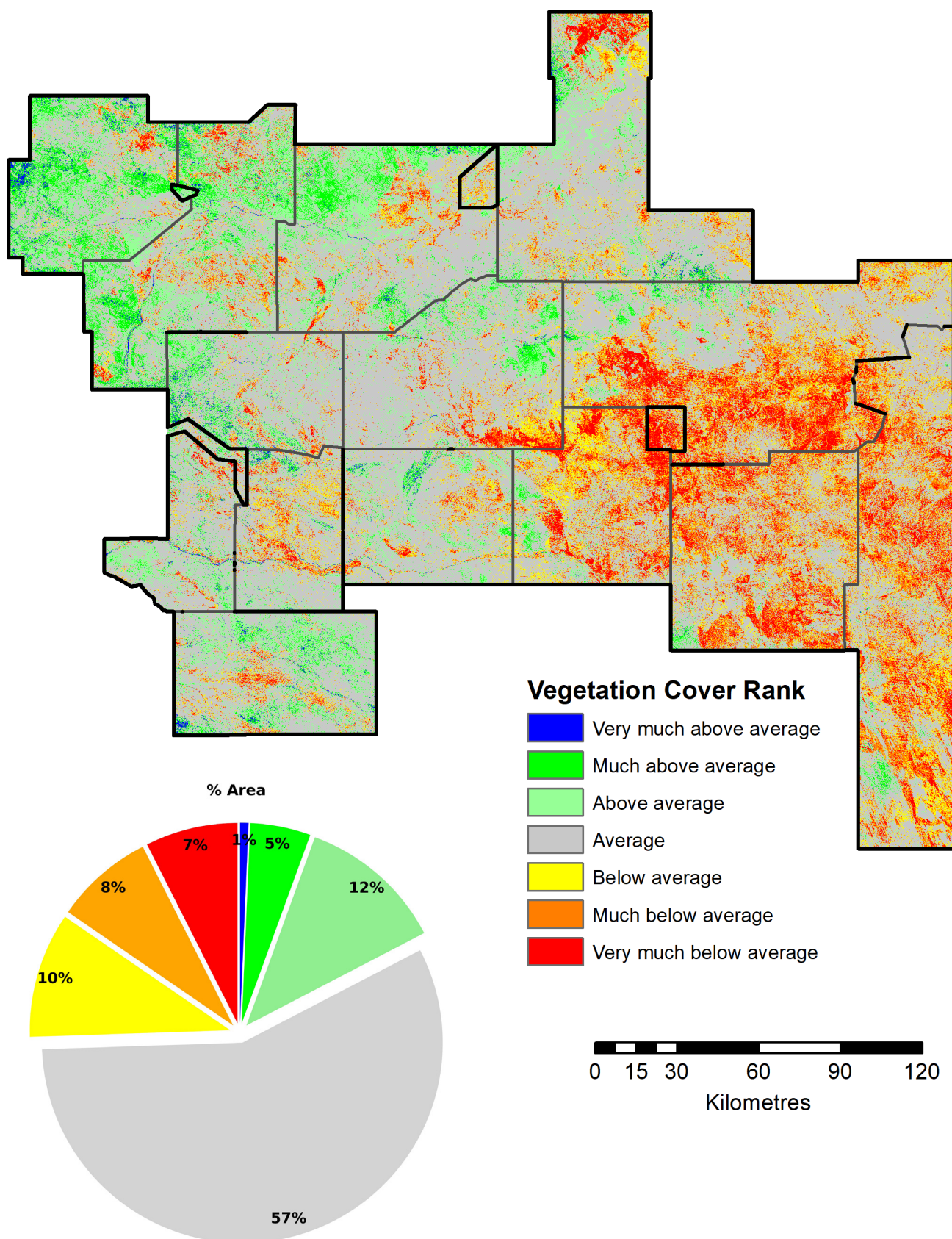


Figure 21. Rank of the amount of remotely sensed vegetation cover present in late 2021 in the Plenty Pastoral District against previous years back to 1988. Pie chart shows the percentage of area of each vegetation cover rank.

PLENTY PASTORAL DISTRICT

Site-based monitoring

Two pastoral leases in the Plenty Pastoral District were visited in 2021 (Table 19). Vegetation cover of the was measured at 21 sites on these leases.

Vegetation cover was generally low. Bare ground on average was moderate to high with the average bare ground being above 60%.

Monitoring sites in Good condition were less common. These sites had moderate bare ground cover levels, averaging 50%. Perennial and annual grass cover was at a low to moderate level, with perennial grasses, particularly buffel grass, dominating the vegetation cover. Forbs had an extremely low cover and leaf litter cover was quite low.

Monitoring sites in Fair to Poor condition had a low vegetation cover and perennial grass cover was low. Annual grass cover was also low and forb cover had increased at these sites. Leaf litter cover remained at about the same level. Bare ground levels at these sites was significantly higher, averaging over 65%. 3P grass species were not common and were replaced by lower value grasses, forbs and bare ground.

No monitoring sites were recorded in Excellent condition.

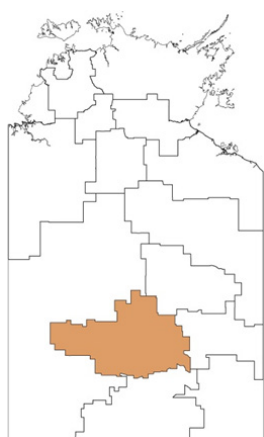
Weeds and areas of erosion were generally not an issue at any of the monitoring sites.

PLENTY PASTORAL DISTRICT

Table 19. Summary of land condition assessments in the Plenty Pastoral District.

Pastoral lease	Land condition rating by sites	Comments on land condition
1	Good: 3 Fair: 3 Poor: 1	<p>Overall land condition was assessed as Fair, which has transitioned to a declined single rating from the Good/Fair rating in 2016.</p> <p>Land condition on this pastoral lease was highly variable with underutilised and less pastorally productive areas being in better condition than the more heavily utilised and higher pastoral value areas. Buffel grass was the most common of the 3P grasses, with perennial grass cover being variable across the property. Bare ground was at moderate levels, averaging over 50% at monitoring sites.</p> <p>No weeds were observed.</p> <p>Minor water and wind scalding was observed on some monitoring sites but no gullying observed along tracks and fences and the erosion mitigation with whoa-boys and drains were in good condition.</p> <p>No feral animals observed, however donkey sightings reported.</p> <p>No areas of woody thickening were observed.</p> <p>Fire scar data indicates that this pastoral lease has not experienced a significant wildfire since 2011. The mean percentage of the station burnt annually in the past 20 years is 8% with the worst fire year being 2011 where 70% burnt due to high fuel loads following high rainfall. There were no fires in 2021 prior to the inspection and only 12% of the property has burnt since the previous inspection in 2016.</p>
2	Good: 1 Fair: 6 Poor: 6	<p>Overall land condition was assessed as Fair, which has transitioned to a declined single rating from the Good/Poor rating in 2016.</p> <p>The lease has experienced a reduction in ground cover due to limited rainfall and severe erosion. Less pastorally important areas are in Good to Fair condition. Alluvial areas through the middle of the property showed the presence of buffel grass, and important fodder, but this has retreated to the creek lines and is being heavily grazed.</p> <p>Bare ground was at high levels, averaging over 65% at monitoring sites predominantly in prime grazing areas.</p> <p>Large infestation of noogoora weed species observed, and visibly spreading.</p> <p>Serious and active erosion observed along tracks across the property.</p> <p>Camels and one wild horse was observed.</p> <p>No woody thickening observed.</p> <p>Fire scar data indicates rare fires with only one instance in 2011 that seen 40% of the property burnt. The mean percentage burnt annually in the past 20 years is 3%. No fires have occurred on the property since 2013 when 72km² of the station was burnt and no recent fires influenced both the 2016 and the 2021 monitoring inspections.</p>

NORTHERN ALICE SPRINGS PASTORAL DISTRICT



The Northern Alice Springs Pastoral District covers 103 000km² over 28 pastoral leases.

Rainfall was average to above average for the Northern Alice Springs Pastoral District. Spatially averaged rainfall for the Northern Alice Springs Pastoral District was well above the long-term median (Table 20). Over 85% of the District recorded well-above average. However, areas in the south and west recorded average rainfall.

Vegetation cover in late 2021 was average to above average across the District. Approximately 72% of the District had above average vegetation cover and the remainder of the District was average.

The Northern Alice Springs Pastoral District had very low fire activity between January and December 2021 (Figure 22), with 2.2% of the District impacted by fire.

On-ground monitoring for land condition was conducted at 107 sites on eleven pastoral leases. Vegetation cover was generally good and bare ground was low. Perennial grass cover was low and annual grass cover was high, with greater than 50% more cover than the perennials. Forb cover was relatively low and leaf litter cover making up the largest component of the ground cover.

Overall land condition at all eleven leases inspected during 2021 were rated as Fair and Good. Pastoral leases in the Northern Alice Springs Pastoral Districts exhibited the most improved ratings with four leases improving and four maintaining an overall land condition rating of Good or Fair. Three leases transitioned to a single rating (i.e. Good/Fair to Fair).

Table 20. Rainfall for the Northern Alice Springs Pastoral District.

Rainfall (mm)

2021	374
Long-term median (1900–2020)	256

NORTHERN ALICE SPRINGS PASTORAL DISTRICT

Fire

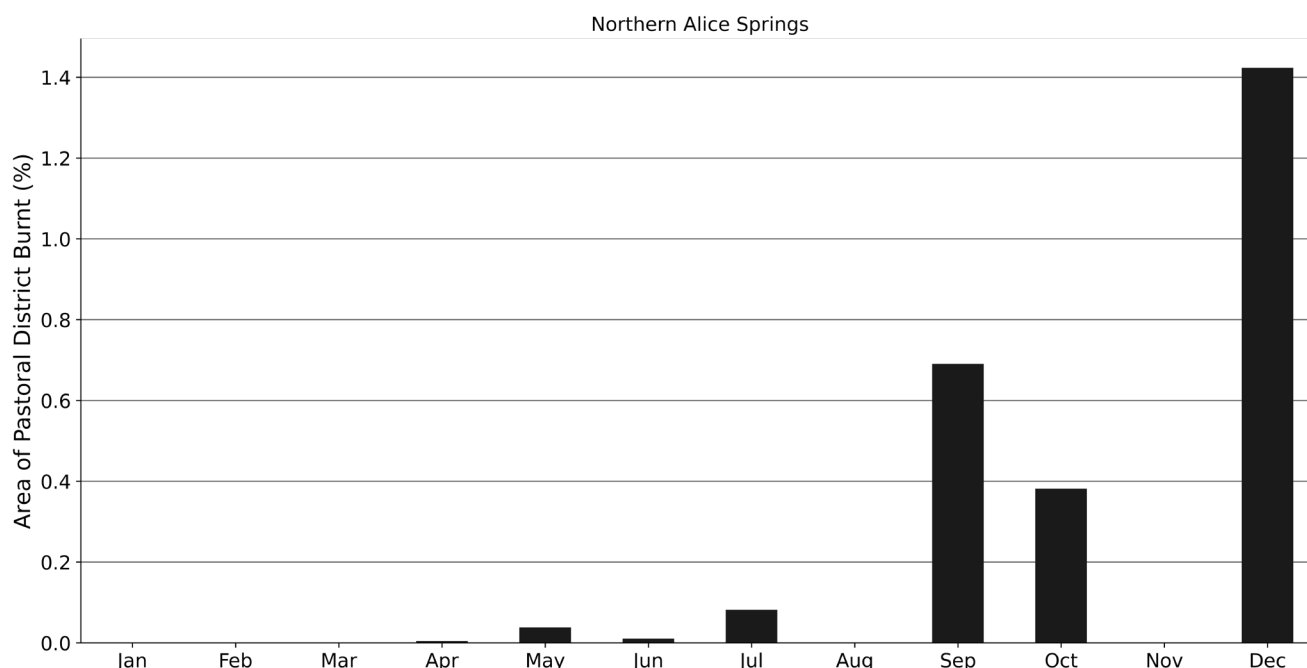


Figure 22. Percentage of the area burnt each month in the Northern Alice Springs Pastoral District.

Total vegetation cover and bare ground dynamics

It is important to maintain adequate ground cover in the latter months of each year to minimise soil loss from wind erosion and intense summer storms. The highly variable nature of rainfall in the southern NT also means that it is necessary to carry dry feed, and associated ground cover, into the hotter months in case summer rains fail.

The amount of vegetation present at any location changes from year to year depending on rainfall and its effectiveness, fire history and amount of grazing. The percentage of vegetation in each 30m square Landsat pixel (900m² or 0.09 ha) was used to report the amount of vegetation cover across all pixels in the Northern Alice Springs Pastoral District for the end of dry season (September to November Spring composite).

Vegetation cover was well above average across 71% of the Northern Alice Springs Pastoral District (Figure 23).

NORTHERN ALICE SPRINGS PASTORAL DISTRICT

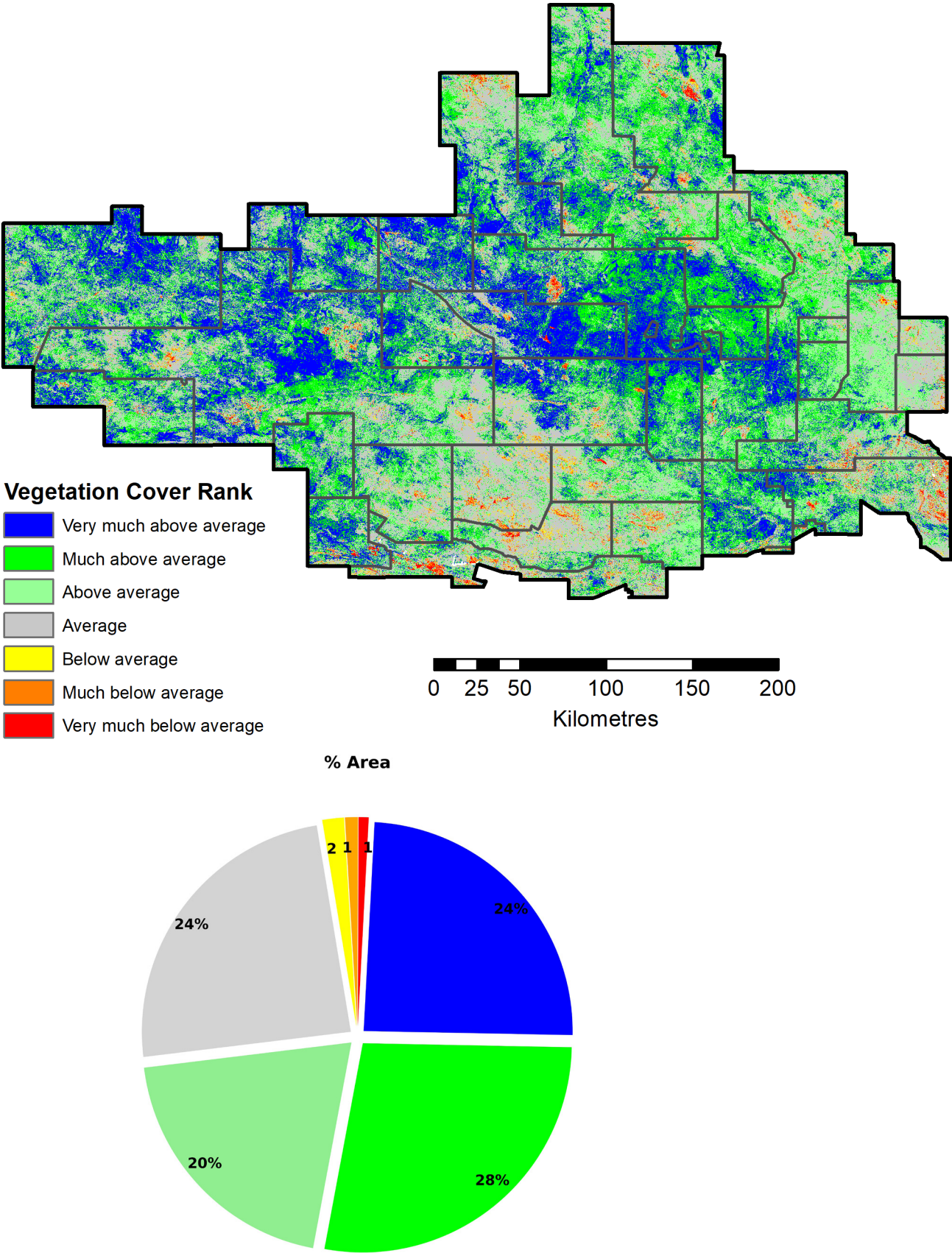


Figure 23. Rank of the amount of remotely sensed vegetation cover present in late 2021 in the Northern Alice Springs Pastoral District against previous years back to 1988. Pie chart shows the percentage of area of each vegetation cover rank.

NORTHERN ALICE SPRINGS PASTORAL DISTRICT

Site-based monitoring

Eleven pastoral leases in the Northern Alice Springs Pastoral District were visited in 2021 (Table 21). Vegetation cover of the ground layer was measured at 107 sites on these leases.

Vegetation cover was generally good. Bare ground was low and leaf litter made up the remaining ground cover.

One monitoring site was recorded in Excellent condition. The majority of sites were in Fair condition. Monitoring sites in Fair to Poor condition had low vegetation cover. Perennial grass cover was lower and the bulk of the difference being in annual grass cover, which was significantly lower. Forb cover remained at similar levels, with leaf litter cover being higher. Bare ground levels at these sites was slightly higher, averaging 25%. 3P grass species were not as common, being replaced by lower value grasses, forbs and bare ground.

Weeds were not observed at any of the monitoring sites.

Table 21. Summary of land condition assessments in the Northern Alice Springs Pastoral District.

Pastoral lease	Land condition rating by sites	Comments on land condition
1	Good: 2 Fair: 8	<p>Overall land condition was assessed as Fair, which has improved from the Poor rating in 2016.</p> <p>The improved land condition rating was due to significant recent rainfall events and reduced stock numbers. All the sites had decreased bare ground (average falling from 68% in 2016 to 25% in 2021). Litter cover had increased from 17% to 34%.</p> <p>The average vegetation cover increased from 15% in 2016 to 41% in 2021. The vegetation was short-lived species, including bunched kerosene and eight-day grass. Some palatable perennial grasses, including buffel grass, silky browntop and golden beard grass were also recorded.</p> <p>No weeds, feral animals or woody thickening were observed.</p> <p>Erosion had stabilised in most areas, except for some areas of historical erosion around roads.</p> <p>Fire scar data indicates that fire has affected this pastoral lease nearly every year since 2000. The mean percentage of the station burnt annually in the past 20 years is 6%, with the worst fire year being in 2001 where 38% of the station was burnt. This was due to high fuel loads of pasture grasses because of higher than average rainfall in the preceding year.</p>

NORTHERN ALICE SPRINGS PASTORAL DISTRICT

Pastoral lease	Land condition rating by sites	Comments on land condition
2	Good: 6 Fair: 4 Poor: 1	<p>Overall land condition was assessed as Good, which has improved from the Fair rating in 2016.</p> <p>The improved land condition rating was due to significant rainfall in late 2020, responsive herd management and strategic grader work on degraded areas to encourage water holding capacity and seed germination. The vegetation cover has increased significantly since the previous inspection and bare ground has decreased. At most sites, there was a relatively good cover of annual grasses, some perennial grasses, including 3P's and forbs.</p> <p>Athel pine and rubber bush were observed on the previous inspection but were not recorded in 2021. No feral animals or areas of woody thickening were observed.</p> <p>Erosion had stabilised in most areas, except for some areas of historical erosion.</p> <p>Fire scar data indicate that fire has affected in four of the past ten years. The mean percentage of the station burnt annually in the past 20 years is 3% and the worst fire year was 2011 when 56% of the station was burnt. There were no fires in 2021 and only 1% of the property has burnt since the previous inspection.</p>
3	Good: 1 Fair: 8	<p>Overall land condition was assessed as Fair, which has transitioned to an improved single rating from the Fair/Poor rating in 2016.</p> <p>The improved land condition rating was due to significant rainfall in late 2020. All the sites had decreased bare ground (average falling from 74% in 2016 to 26% in 2021). The average vegetation cover had increased from 9% in 2016 to 52% in 2021. A healthy proportion of perennial grass species were present at monitoring sites, with infilling by annual grasses and forbs.</p> <p>No weeds were observed.</p> <p>Camels were observed.</p> <p>Woody thickening was recorded in the east of the property.</p> <p>Erosion had stabilised in most areas, except for some areas of historical erosion.</p> <p>Fire scar data indicates that wildfires burnt 37% of the station in 2001 and 15% of the station in 2011. During the past 20 years, less than 5% of the station has been burnt on average.</p>
4	Good: 1 Fair: 15 Poor: 1	<p>Overall land condition was assessed as Fair, which has improved from the Poor rating in 2016.</p> <p>The monitoring sites recorded higher levels of vegetation and litter cover. Bare ground had decreased significantly since the last inspection, with the low levels (average <20%) being recorded at the monitoring sites. Most of the pasture grasses had dried off.</p> <p>Rubber bush was observed in small isolated populations and is actively being managed.</p> <p>No erosion, feral animals or woody thickening were observed.</p> <p>Fire scar data indicated that fire activity had been consistent on the property since 2000. The highest percentage of area burnt on the property was during the 2001/02 and 2011 fires (41% and 27% respectively), with a 20-year annual mean burn area of 5%.</p>

NORTHERN ALICE SPRINGS PASTORAL DISTRICT

Pastoral lease	Land condition rating by sites	Comments on land condition
5	Good: 1 Fair: 12 Poor: 1	<p>Overall land condition was assessed as Good, which has transitioned to an improved single rating from the Good/Fair rating in 2016.</p> <p>The improved land condition rating was due to significant rainfall in late 2020, responsive and conservative herd management and conservative stocking rates.</p> <p>The monitoring sites recorded very good vegetation cover and little active erosion. Buffel grass tussocks had 'greened up' and were in excellent condition. Short-lived annual grasses and forbs had responded well to rainfall and were observed to be filling the gaps between perennial tussocks. Buffel grass is well established across the property and its presence contributes significantly to ground layer vegetation.</p> <p>One noogoora burr plant was observed.</p> <p>No feral animals were observed.</p> <p>Gullying along a track in the south of the property was recorded. Whoa boys, ponding banks and diversion banks have been established across most tracks and fence lines.</p> <p>Fire scar data indicates that fires affected the lease in 2011 and 2018. The mean percentage of the station burnt annually in the past 20 years is 3% and the worst fire year was 2011, where 47% of the property burnt. There were no fires in 2021 prior to the inspection, with 15% of the property burning in 2018, which was the only serious wildfire since the last inspection in June 2016.</p>
6	Good: 7 Fair: 2	<p>Overall land condition was assessed as Good, which is consistent with the assessment in 2016.</p> <p>Land condition was consistently good across the lease, due to good recent rainfall and grazing management. Vegetation cover at monitoring sites had almost doubled since 2016 and the bare ground average decreased to <25%. These sites contained a good cover of palatable grass species, including buffel grass and bluegrass. Rainfall and conservative stocking rates has contributed to buffel grass forming a stabilising cover and fodder source.</p> <p>No weeds, feral animals or woody thickening were observed.</p> <p>Tracks and roads have been graded at the level of the surrounding country with minimal windrows.</p> <p>Fire scar data indicates that the property has experienced fires sporadically since 2000. The annual mean percentage of the station burnt over the past 20 years is 5%. The highest percentage of burnt area (73%) was recorded in 2001.</p>
7	Good: 1 Fair: 9 Poor: 2	<p>Overall land condition was assessed as Fair, which is consistent with the assessment in 2016.</p> <p>All sites recorded low levels of bare ground (average a low 19%) with similar or an increase in litter percentages. Overall ground cover was good. However, it did not comprise desirable perennials. The highest increase of ground cover was in forb percentages and resulted in some sites declining in land condition. Kerosene grass and roly poly were recorded as establishing and flourishing.</p> <p>General observations concluded that some areas on the property were utilised more than others were and subsequently experienced the effects of sustained grazing pressures.</p> <p>No weed species, feral animals or woody thickening were observed.</p> <p>Scalded areas have mostly stabilised because of the increase in ground cover levels. No new erosion was recorded.</p>

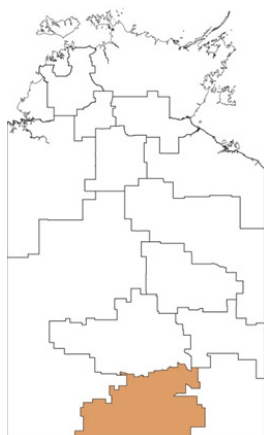
NORTHERN ALICE SPRINGS PASTORAL DISTRICT

Pastoral lease	Land condition rating by sites	Comments on land condition
8	Fair: 7 Poor: 3	<p>Overall land condition was assessed as Fair, which has transitioned to a declined single rating from the Good/Fair rating in 2016.</p> <p>The decline in land condition is a result of fire and below average rainfall. Annual grasses dominated most areas and there was less than expected palatable perennial grasses. Vegetation cover and bare ground have both decreased and there were notable records of reduced palatable perennial grass species at the monitoring sites.</p> <p>Some individual rubber bush plants were recorded.</p> <p>No woody thickening or feral animals were observed.</p> <p>Erosion had stabilised in most areas. Newly constructed tracks and roads were noted to include active erosion prevention measures to respond to the highly susceptible soils.</p> <p>Fire scar data indicates that fire has affected this property since 2000. The mean percentage of the station burnt annually in the past 20 years is 8% and the worst fire year was 2011 where 42% of the station was burnt.</p>
9	Good: 2 Fair: 2 Poor: 1	<p>Overall land condition was assessed as Fair, which is consistent with the assessment in 2016.</p> <p>Land condition varied across the lease. The productive alluvial country showed some areas were utilised heavily. These areas generally had reasonable ground cover and a mix of annual grasses. Productive perennial grasses were less abundant than expected, while leaf litter was unusually high. The bare ground average at monitoring sites was 19%.</p> <p>Some areas on the property are being utilised more than others and showed evidence of sustained grazing pressures.</p> <p>Athel pine was observed.</p> <p>No woody thickening or feral animals were observed.</p> <p>This pastoral lease has sustained an annual mean area burnt of 7% over a 20-year period, with the highest percentage of area burnt in 2001 (58%) and 2011 (56%).</p>
10	Good: 2 Fair: 3	<p>Overall land condition was assessed as Good, which has improved from the Fair/Poor rating in 2016.</p> <p>Most of the lease was in Good condition. The productive land systems were generally assessed in Fair condition and comprise approximately 27% of the property.</p> <p>Since the previous inspection visit, all sites have decreased in bare ground levels with the average falling from 60% in 2016 to a low 27% in 2021. The average vegetation cover has increased from 29% in 2016 to 56% in 2021, corresponding with the decrease in bare ground levels. Litter cover remained relatively stable.</p> <p>No weeds were observed.</p> <p>Feral horses and donkeys are a long-standing issue and were observed.</p> <p>Severe historic gullyng was observed on the floodplains and river. Gully erosion was also observed from tracks near drainage lines. Areas of scalding were also observed.</p> <p>Fire scar data indicates that fires in 2011 burnt approximately 39% of the property and 15% in 2012. The last fire recorded was in January 2013 when 4% was burnt.</p>

NORTHERN ALICE SPRINGS PASTORAL DISTRICT

Pastoral lease	Land condition rating by sites	Comments on land condition
11	Good: 1 Fair: 4	<p>Overall land condition was assessed as Good, which is consistent with the assessment in 2016.</p> <p>Conservative stocking rates and targeted sustainable land management are actively implemented. Vegetation cover was good and the bare ground average at monitoring sites was 27%.</p> <p>No weeds, feral animals, erosion or woody thickening were observed.</p> <p>Fire scar data indicates that fire has affected the property in three of the past ten years. The mean percentage of the station burnt annually in the past 20 years is 4% and the worst fire year was 2001 where 50% of the station was burnt.</p>

SOUTHERN ALICE SPRINGS PASTORAL DISTRICT



The Southern Alice Springs Pastoral District covers 92 500km² over 25 pastoral leases.

Rainfall was average to above average across the Southern Alice Springs Pastoral District. Spatially averaged rainfall for the Southern Alice Springs Pastoral District was well above the long-term median (Table 22). Above average rainfall occurred across 77% of the District.

The Southern Alice Springs Pastoral District had very low fire activity between January and December 2021 (Figure 24), with only 0.7% of the District impacted by several small fires in September and October 2021.

Vegetation cover in late 2021 was varied across the District. Approximately 50% of the District had average levels of vegetation cover and the remainder of the District was above or below the average.

On-ground monitoring for land condition was conducted at 28 sites on three pastoral leases.

Vegetation cover was generally low at all sites. Bare ground moderate. The vegetation cover was perennial grasses, annual grasses, forbs and leaf litter. Perennial grass cover was very low, with cover generally being dominated by short lived annual grass and forb species rather than perennial pasture grass species.

Overall land condition at all three leases inspected during 2021 were rated as Fair. One lease maintained a land condition rating of Fair and the others transitioned to an improved single rating (i.e. Fair/Poor to Fair).

Table 22. Rainfall for the Southern Alice Springs Pastoral District.

Rainfall (mm)	
2021	232
Long-term median (1900–2020)	165

SOUTHERN ALICE SPRINGS PASTORAL DISTRICT

Fire

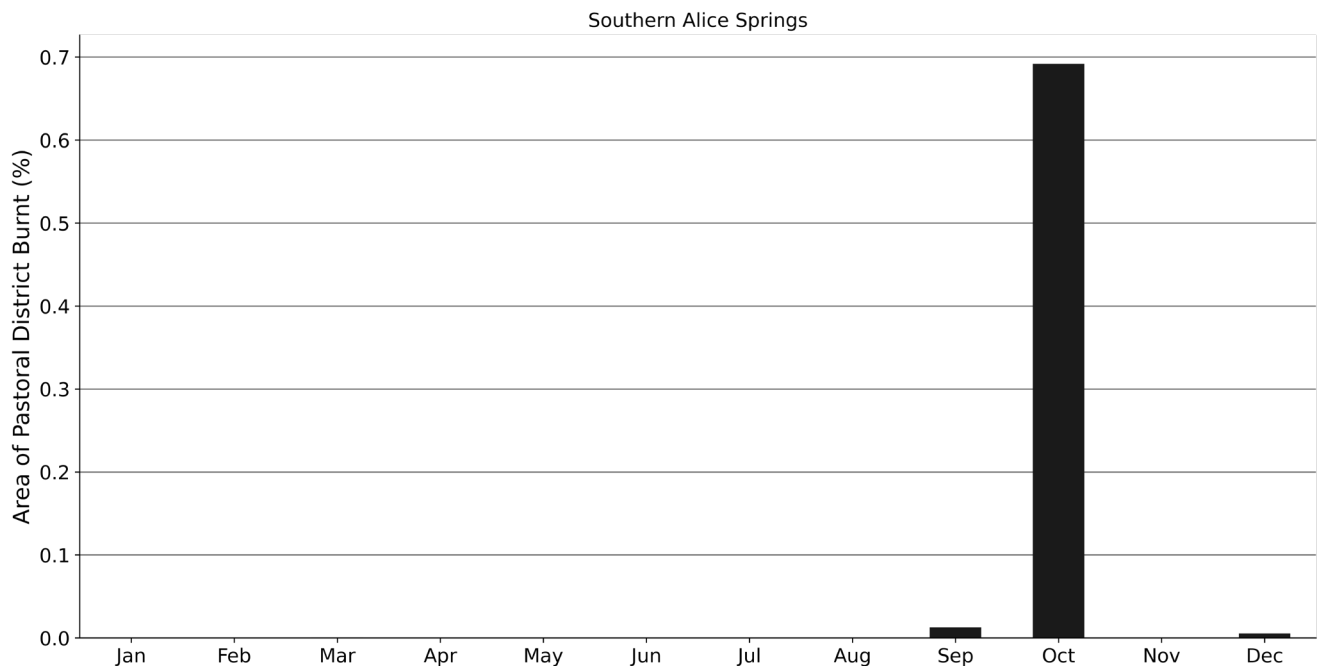


Figure 24. Percentage of the area burnt each month in the Northern Alice Springs Pastoral District.

Total vegetation cover and bare ground dynamics

It is important to maintain adequate ground cover in the latter months of each year to minimise soil loss from wind erosion and intense summer storms. The highly variable nature of rainfall in the southern NT also means that it is necessary to carry dry feed, and associated ground cover, into the hotter months in case summer rains fail.

The amount of vegetation present at any location changes from year to year depending on rainfall and its effectiveness, fire history and amount of grazing. The percentage of vegetation in each 30m square Landsat pixel (900m² or 0.09 ha) was used to report the amount of vegetation cover across all pixels in the Southern Alice Springs Pastoral District for the end of dry season (September to November Spring composite).

Vegetation cover was above average across 31% of the Southern Alice Springs Pastoral District (Figure 25). Approximately 50% of the District was ranked as average and 18% was below average. The above average cover across the District is likely to be related to the above average rainfall.

SOUTHERN ALICE SPRINGS PASTORAL DISTRICT

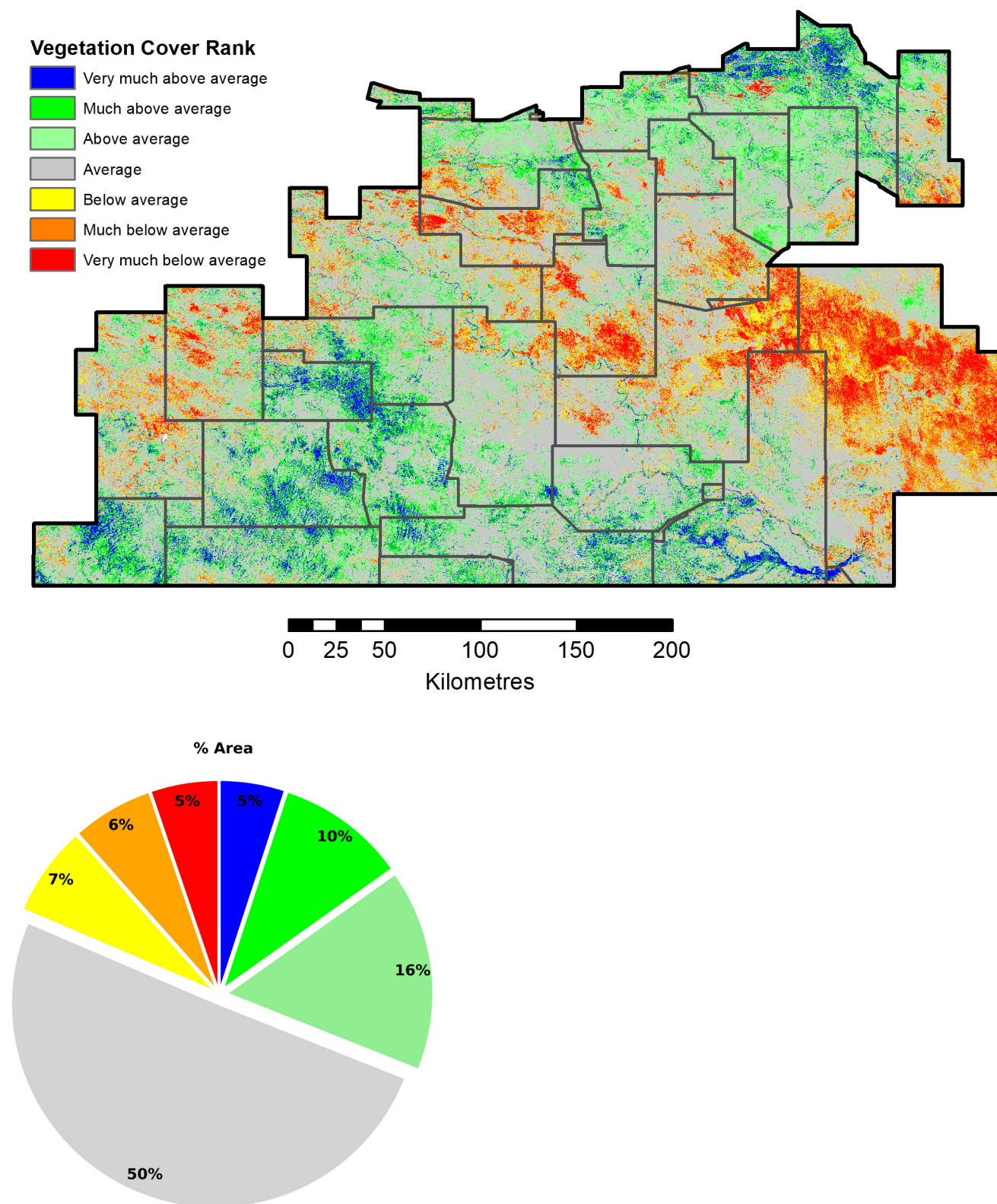


Figure 25. Rank of the amount of remotely sensed vegetation cover present in late 2021 in the Southern Alice Springs Pastoral District against previous years back to 1988. Pie chart shows the percentage of area of each vegetation cover rank.

SOUTHERN ALICE SPRINGS PASTORAL DISTRICT

Site-based monitoring

Three pastoral leases in the Southern Alice Springs Pastoral District were visited in 2021 (Table 23). Vegetation cover of the ground layer was measured at 28 sites on these leases. Bare ground at these sites was averaging over 45%

Vegetation cover was generally low and bare ground was moderate.

Monitoring sites in Fair to Poor condition had low vegetation cover and perennial grass cover was very low. Annual grass cover was also lower and forb cover had increased at these sites.

No monitoring sites were recorded in Excellent condition. Monitoring sites in Good condition had moderate bare ground levels, averaging 40%. Perennial and annual grass cover was low to moderate and the vegetation cover was perennial grasses, annual grasses, forbs and leaf litter.

Weeds were not observed at any of the monitoring sites.

Table 23. Summary of land condition assessments in the Southern Alice Springs Pastoral District.

Pastoral lease	Land condition rating by sites	Comments on land condition
1	Good: 1 Fair: 8 Poor: 1	<p>Overall land condition was assessed as Fair, which is consistent with the assessment in 2016.</p> <p>Land condition varied across the lease. Productive areas had improved and stabilised following prolonged drought-like conditions. Several monitoring sites recorded high coverage of pasture grasses.</p> <p>The productive alluvial country in the north and south-west areas were more utilised than other areas. Areas in the Simpson land system showed no evidence of grazing and may have been spelled in 2021.</p> <p>Bare ground levels across the monitoring sites had declined by an average 27% since 2016 and ground cover had increased by an average of 17%. The increase in ground cover was attributable to 3P grasses and undesirable pasture species. Other ground covers, such as annual grasses and forbs, had remained at similar levels since 2016.</p> <p>No weeds were observed. However, ruby dock was observed in small numbers in different areas on the pastoral lease.</p> <p>Feral camels and horses were not sighted but grazing patterns, tracks and scats indicated the likely presence.</p> <p>Historic areas of mild to severe erosion were observed. Active areas of scalding were observed.</p> <p>Fires have consistently affected the lease. Extensive fires have been recorded in 2008, 2011 and 2012. Smaller and isolated burned have been recorded in 2017, 2018 and 2019.</p>

SOUTHERN ALICE SPRINGS PASTORAL DISTRICT

Pastoral lease	Land condition rating by sites	Comments on land condition
2	Good: 1 Fair: 9 Poor: 1	<p>Overall land condition was assessed as Fair, which has transitioned to an improved single rating from the Fair/Poor rating in 2016.</p> <p>Most of the sites were in Fair condition. Vegetation cover was a mix of perennial and annual grasses and forbs. Most sites showed a reasonable response to rainfall after prolonged dry conditions. Bare ground was moderate, averaging just under 50%.</p> <p>The soils are susceptible to erosion and natural and accelerated erosion was recorded, including active rill, sheet and gully erosion.</p> <p>Camels were observed and the land manager estimated that approximately 1500 feral donkeys had been recently culled.</p> <p>No weeds or woody thickenings were observed.</p>
3	Good: 1 Fair: 4 Poor: 2	<p>Overall land condition was assessed as Fair, which has transitioned to an improved single rating from the Fair/Poor rating in 2016.</p> <p>Vegetation cover had improved and bare ground has decreased at all monitoring sites. The cover is dominated by short-lived annual grass and forb species rather than the preferred perennial pasture species.</p> <p>Spelling and destocking, upgrading pastoral infrastructure and erosion controls are active management measures that have contributed to the improved land condition rating.</p> <p>No weeds were observed.</p> <p>Historic scalding, wind, and water sheeting are present across the lease. Minor water and wind scalding was observed at some monitoring sites and gullying was observed along tracks and fences. Whoa-boys, ponding banks, drains and ripping are management measures to encourage prolonged water ponding and holding.</p> <p>No feral animals or woody thickenings were observed.</p> <p>Fire scar data indicates that the property has experienced three major fire events in 2002, 2011, and 2012 and one minor event in 2017. The mean percentage of the station burnt annually over this period is 3% and the highest was 48% of the property burnt in 2002.</p>

SUPPLEMENTARY INFORMATION



MEETINGS OF THE BOARD

The Board held nine meetings between 1 January and 31 December 2021

At each meeting, it considered standing items on the status of pastoral applications, correspondence and general functions of the Board.

The Board made the following decisions at its meetings in 2021.

Meeting 136 – 9 February 2021

- Approved Pastoral Land Clearing Guidelines (version 9) Schedule 1 – Simplified clearing application assessment policy application criteria
- Endorsed the weed management plans for Scott Creek
- Published the Board's newsletter

Meeting 137 – 23 & 24 March 2021

- Endorsed the plan of development for Douglas West
- Recommended a rent release methodology to the Minister

Meeting 138 – 11 May 2021

Meeting 139 – 7 June 2021

- Commenced consultation on the draft Compliance Framework
- Endorsed the clearing drawings for Hidden Valley

Meeting 140 – 21 July 2021

Meeting 141 – 7 September 2021

- Published Pastoral Land Clearing Guidelines (version 9.1)
- Approved the manner to exhibit pastoral applications on the pastoral notices platform and placed advertisements advising the change
- Issued clearing permit PLC21/01 for Avago

Meeting 142 – 26 October 2021

- Published Pastoral Land Board Delegations

Meeting 143 – 2 December 2021

- Issued clearing permit PLC21/05 for Conway
- Issued clearing permit PLC21/07 for Newcastle Waters
- Issued clearing permits PLC21/08 & PLC21/04 for Scott Creek
- Published the 2022 meeting dates

14 December 2021

- Issued clearing permit PLC21/06 for Ucharonidge

PERMITS ISSUED BY THE BOARD

Land clearing

The Board issued six clearing permits.

Lease	Purpose	Area (ha)	Permit
Ucharonidge	Pastoral Purposes	4890.57	PLC21/06
Conway	Pastoral Purposes	1038.74	PLC21/05
Scott Creek	Pastoral Purposes	879.06	PLC21/04
Scott Creek	Pastoral Purposes	558.86	PLC21/08
Newcastle Waters	Pastoral Purposes	484.61	PLC21/07
Avago	Pastoral Purposes	4073.61	PLC21/01

Non-pastoral use

The Board did not issued any non-pastoral use permits.



PASTORAL
LAND BOARD

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Pastoral Land Board Northern Territory 2022