



Northern  
Territory  
Government

# Pastoral Land Board



Annual Report  
2008/09



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## Chairman's Foreword

The Annual Report of the Pastoral Land Board for 2008/09 covers the period 1 October 2008 to 30 September 2009 in line with a seasonal reporting period approved by the Minister in May 2005.

The Northern Territory pastoral estate is about 606,000 km<sup>2</sup> in size. The gross value of production for the NT cattle industry was estimated at \$323.8 million in 2007/08, which represents approximately 48% of the total value of the Territory's rural industries and fisheries production.

One of the important functions of the Pastoral Land Board is to monitor the condition and use of pastoral land to facilitate its sustainable use and the economic viability of the industry in accordance with the objects of the *Pastoral Land Act*. The Board is committed to the maintenance of the condition of the Territory's pastoral land and, where possible, its improvement.

The Board is concerned that the momentum of the pastoral land monitoring programs has slowed in recent years. The ground based monitoring programs have fallen significantly behind schedule and there are more than 80 properties that have not been visited for more than 4 years, with some properties not being visited in more than 6 years.

Ground based monitoring data provided to the Board for 2008/09 is limited to 22 properties across two pastoral districts (Barkly and Plenty). The Board is unable to provide an objective assessment of land condition in the remaining pastoral districts, although comments have been provided on pasture growth and standing biomass as determined by AussieGRASS models. Estimates of bare ground ranking using MODIS satellite imagery have been included in this report for the VRD, Tennant Creek, Northern Alice Springs and Southern Alice Springs Pastoral Districts.

The Board thanks its Executive Officer, Ms Judy Bartolo, and officers of the Natural Resources Division, Department of Natural Resources, Environment, the Arts and Sport (NRETAS) who have given the Board invaluable support, assistance and advice. In particular the Board acknowledges the role of staff within the Land Resources Branch who are responsible for the pastoral land monitoring programs. It is hoped that sufficient resources will be provided to enable the continued operation and implementation of these monitoring programs and where required the development and implementation of management plans to address land condition issues.



**Anthony Young**

Chairman

Pastoral Land Board

23 August 2010

## Membership of the Board

### Chairman

Anthony David Young                      3 year term – expiring 25 June 2010

### Members

Colleen Marie Costello                      3 year term – expiring 25 June 2011  
Steven Craig                                      3 year term – expiring 25 June 2011  
Michael Francis Quirk                      3 year term – expiring 25 June 2010  
Thomas George Henry Stockwell              3 year term – expiring 25 June 2011

### Executive Officer

Judy Bartolo

## Functions of the Board

Section 29 of the *Pastoral Land Act* outlines the functions of the Board:

- [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;
- [j] to make recommendations to the Minister on any matter relating to the administration of the Act;
- [k] to hear and determine all questions, and consider and make recommendations on all matters, referred to it by the Minister; and
- [m] such other functions as are imposed on it by or under the *Pastoral Land Act* or any other Act or as directed by the Minister.

Other functions outlined in the Act include:

- i. to determine applications for clearing pastoral land [section 38(1)(h)]
- ii. to consider breaches of conditions referred by the Minister [section 41]
- iii. to consider and make recommendations to the Minister on applications for conversion of term pastoral leases to perpetual tenure [section 62]
- iv. to administer the access provisions of the Act, including nomination of access routes under PART 6
- v. to determine applications for non pastoral use of pastoral land [PART 7].

## Meetings of the Board held during 2008/09

Four meetings of the Pastoral Land Board were held during 2008/09. In addition to these meetings, 6 matters were determined out of session and four applications were considered by sub-committees of the Board with relevant property inspections.

### **78<sup>th</sup> Meeting: teleconference held 18 November 2008**

The Board considered a request from the Minister for further information in respect of subdivision of pastoral leases and criteria for assessment of applications.

### **79<sup>th</sup> Meeting: teleconference held 17 December 2008**

The Board gave further consideration to a subdivision application and an application to convert a term lease to perpetual tenure and determined its recommendation to the Minister in respect of both applications. The Board also considered a clearing application and determined a non pastoral use application. Other matters discussed included reforms for native vegetation management and a proposed regional field trip to the Sturt Plateau to inspect historic clearing development and areas currently proposed for clearing.

### **80<sup>th</sup> Meeting: teleconference held 21 May 2009**

The Board gave further consideration to an application to convert a term lease to perpetual tenure and determined its recommendation to the Minister. Two applications for non pastoral use were determined and the Board also gave preliminary consideration to a subdivision application and an application to convert a term lease to perpetual tenure. Other matters considered included proposed revisions to the NT Land Clearing Guidelines, endorsement of the Board Annual Report 2006/07 for submission to the Minister, and further information provided to the Minister in respect of a subdivision application.

### **81<sup>st</sup> Meeting held at Sunday Creek Station 6 August 2009**

The Board gave further consideration to a subdivision application and determined its recommendation to the Minister. Three applications for non pastoral use were determined, endorsement of a development plan, consideration of a clearing application, and preliminary consideration of an application to convert a term lease to perpetual tenure. Other matters discussed included the methodology used for collection of monitoring data and assessment of land condition.

### **Sturt Plateau regional field trip August 2009**

The Board undertook a field trip of the Sturt Plateau region in conjunction with the 81<sup>st</sup> Meeting held August 2009. The purpose of the field trip was to meet with local pastoralists and to inspect areas of cleared country and proposed clearing sites on five properties across the region.

Discussions focused on:

- the size of areas cleared – small v large areas;
- techniques used to clear the land – raking, ploughing and chaining;
- economics of clearing eg. difficulty in employing contractors to clear smaller areas of land;
- the benefits of a staged clearing process;
- methods used to maintain cleared land; and
- the value of monitoring areas approved for clearing.

## Policy Issues and New Initiatives

### **Review of the *Pastoral Land Act***

The Board had no further input to the review of the *Pastoral Land Act* during 2008/09.

### **Guidelines for use of Introduced Pastures in Pastoral Lease Development**

Development and implementation of guidelines for use of introduced pastures in Pastoral Lease development has been deferred pending review of the *Pastoral Land Act* and possible legislative amendments. No further progress was made during 2008/09 as the review of the *Pastoral Land Act* has not yet been completed.

### **Requirements for Wildlife Corridors associated with Clearing on Pastoral Land**

During 2007/08 discussions were held with NRETAS officers (Biodiversity Conservation and Land Resources) on requirements for wildlife corridors associated with clearing on pastoral land and provisions of the NT Land Clearing Guidelines. General agreement was reached that a benchmark of 500 ha was appropriate for clearing on pastoral land before a wildlife corridor was required.

A review of the NT Land Clearing Guidelines commenced during 2008/09.

### **Reforms for native vegetation management and land clearing controls**

In December 2008, the NT Government announced major reforms for native vegetation control including the proposed introduction of a new Native Vegetation Management Act covering all land tenures. New processes were also introduced requiring all applications to clear more than 200 hectares to be directed to the Minister for Natural Resources, Environment and Heritage for a decision on whether formal environmental assessment is required.

The Board has been advised that it will be invited to take a role in the development of the new legislation as it will apply to land held under pastoral lease tenure.

## Pastoral Land Monitoring Programs

The Pastoral Land Board, the pastoral industry and the Northern Territory government are working together to maintain or improve the condition of the Territory's pastoral land. This land, held as pastoral leases, comprises around 45% of the Territory. Maintenance of this natural resource in good condition is essential for a profitable and sustainable pastoral industry.

Monitoring and reporting on the condition of pastoral land is a key function of the Pastoral Land Board under the *Pastoral Land Act*. The Board is also responsible for instigating remedial action to restore pastoral land condition. In support of the Board, NRETAS operates a two-tiered pastoral land monitoring system. Both tiers of the monitoring program aim to assist pastoralists in making better management decisions.

The Tier 1 program uses photos and visual assessment of photo-point sites to assess pastoral land condition and changes in condition over time. Pastoralists are encouraged to use the photo-point sites to become more aware of pasture plants and the level of pasture use by stock. This in turn will help them better manage their livestock and land.

Tier 2 programs are designed to provide an objective assessment of pastoral land condition using remote sensing and ground-based assessment methods. Currently, only a small percentage of pastoral land is monitored and updated annually using Landsat satellite data. A project to develop a monitoring program across the whole of the NT using MODIS (Moderate Resolution Imaging Spectroradiometer) satellite imagery to provide annual updates of land condition commenced in March 2007. Estimates of bare ground ranking using MODIS satellite imagery have been included in this report for the VRD, Tennant Creek, Northern Alice Springs and Southern Alice Springs Pastoral Districts (see page 8 for further details).

# Pastoral Land Board Annual Report 2008/09

## Establishment and Reassessment of Tier 1 Photo-Point Monitoring Sites

During 2008/09 a total of 254 monitoring sites were reassessed on 22 properties in the Barkly and Plenty Pastoral Districts (refer Table 1).

Pastoral District	Total No. of Sites	No. of Properties [with Tier 1 sites]	Average Sites/Property	New Sites Established 2008/09	Reassessed 2008/09	
					Sites	Properties
<b>Darwin</b> 21 Pastoral Leases	<b>144</b>	<b>21</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Katherine</b> 7 Pastoral Leases	<b>49</b>	<b>7</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Roper</b> 10 Pastoral Leases	<b>51</b>	<b>10</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>VRD</b> 25 Pastoral Leases	<b>338</b>	<b>25</b>	<b>14</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Sturt Plateau</b> 27 Pastoral Leases	<b>180</b>	<b>26</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Gulf</b> 18 Pastoral Leases	<b>112</b>	<b>17</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Barkly</b> 31 Pastoral Leases	<b>447</b>	<b>31</b>	<b>14</b>	<b>0</b>	<b>122</b>	<b>10</b>
<b>Tennant Creek</b> 8 Pastoral Leases	<b>80</b>	<b>8</b>	<b>10</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Plenty</b> 14 Pastoral Leases	<b>157</b>	<b>14</b>	<b>11</b>	<b>0</b>	<b>132</b>	<b>12</b>
<b>Northern Alice Springs</b> 30 Pastoral Leases	<b>340</b>	<b>30</b>	<b>11</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Southern Alice Springs</b> 26 Pastoral Leases	<b>278</b>	<b>24</b>	<b>12</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Other Tenure All Pastoral Districts</b> Aboriginal Land and Crown Leases	<b>115</b>	<b>15</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Totals</b>	<b>2291</b>	<b>228</b>	<b>10</b>	<b>0</b>	<b>254</b>	<b>22</b>

Table 1: Tier 1 Photo-point Monitoring Sites established and reassessed 2008/09 (1 October 2008 – 30 September 2009)

## Pastoral District Reports 2008 /09

### General Definition of Land Condition

A general definition of landscape condition is provided by the Commonwealth Land and Water Audit (2001) “as a value judgement related to the worth of a landscape for a particular use”. In the Northern Territory, where maintaining natural pastures is a primary goal of sustainable pastoral management, landscape condition is most usefully defined in terms of the ability of the land to maintain productivity for future generations. Land condition in the Northern Territory pastoral estate can best be described by three main indicators:

- The distribution of water and nutrients in a landscape often scarce in these essential components, which in turn affects,
- The productivity and composition of pasture plant species, and
- The presence of feral animals and noxious weeds.

### Criteria used to assess Pasture Condition

Three condition classes are used to assess pasture condition (good, fair and poor). These classes are based on indicators of pasture condition such as the abundance of perennial plants known to increase or decrease following grazing, and ground surface indicators such as the exposure of bare soil to wind and water and its subsequent erosion. These indicators of pasture condition and associated assessment criteria have largely been determined from historical information, local knowledge, cross fence comparisons and stock grazing gradients out from water. The further from water the less intense the stock grazing pressure and the higher the condition class rating tends to be.

The condition classes can be described as follows:

**Good:** There is close to maximum diversity and cover of annual and perennial plant species possible for that pasture type with perennial species of various ages. There is no active erosion other than natural features and processes. Plant and litter cover protects the soil from wind and water in all seasons except following fire.

Pastures in good condition are stable and at or close to their productive potential. Pastoral managers should be aiming for good pasture condition, which necessitates careful management practices that maintain or improve pasture condition.

**Fair:** Reduced cover and regeneration of palatable perennial species and there has been some establishment of less preferred unpalatable plants. Productivity remains high in good seasons but is markedly reduced in dry seasons. Lower plant cover increases the susceptibility of soil to erosion in most seasons and there is evidence of moderate erosion on susceptible land types.

Pastures in fair condition are productive, but below their productive potential. They are sometimes actively eroding and can rapidly deteriorate to poor condition. Maintaining pastures in fair condition is not a satisfactory status quo, as long term damage to their productive capacity will result. They should be managed with the aim of improving condition and ultimately achieving good condition status.

**Poor:** The palatable component of the pasture is depleted and the pasture is dominated by annual, ephemeral and unpalatable perennial species. There is no, or markedly reduced, regeneration of desirable perennial plants, productivity is impaired and the seasonal response is poor. Soils are unstable and susceptible to erosion in all seasons and past erosion leaves the site susceptible to further soil movement if grazed.

Pastures in poor condition have severely reduced productivity, which is often especially telling during dry periods. They require a very long period of spelling to improve condition or mechanical intervention such as erosion control earthworks or reseeded may be required.

## Change in Landscape Function (LF) Index

Assessing change in landscape function (landscape 'health') over time can assist in understanding if natural processes or grazing management practices are impacting upon pastoral district or individual station condition. Landscape function describes the capacity of landscapes to regulate (i.e. capture and retain, not leak) rainwater and nutrients, the vital resources for plant growth (Ludwig et al. 1997).

Functional landscapes have a good cover and arrangement of persistent vegetation patches (typically perennial vegetation) such that much of the rainfall is retained and is able to infiltrate the soil, and as there is little runoff, there is limited movement of sediment and loss of entrained nutrients, organic matter (litter) and seeds. Similarly, the good cover and arrangement of vegetation patches minimises wind erosion and loss of nutrients in dust. As patch cover decreases and patches become more distant, runoff increases resulting in lower infiltration and increased nutrient loss in transported sediments (i.e. erosion). These eroding landscapes become progressively more dysfunctional, i.e. have reduced landscape function. The composition of species contributing to pasture biomass (dry weight basis) is estimated at Tier 1 sites. Estimates are adjusted for any grazing that has occurred. The percentage area of bare ground is also estimated so that % ground cover can be calculated as  $100 - \% \text{ bare ground}$ . These two data types have been combined to produce an index of landscape function, therefore potential 'health' of the pastoral districts.

The Richards-Green Functionality Index (RGFI) is a procedure for deriving an index of landscape functionality from data collected at monitoring sites, in the absence of more robust data collected through formal landscape function analysis. The index is based on vegetation and soil attributes that, in combination, contribute to increased retention of rainwater and nutrients as resources for the growth and persistence of plants. These attributes include perennial grass density, vegetation cover and soil surface conditions favourable to water infiltration and retention, nutrient cycling and surface soil stability.

Estimated ground cover has been weighted by the proportion of perennial grasses present (i.e. cover comprised of a high proportion of perennial grasses is assumed to contribute more to improved landscape function than a site with an equivalent cover of annual or ephemeral species).

## Estimated Bare Ground Ranking using MODIS satellite imagery

MODIS satellite imagery is a free multi temporal product, providing global coverage at a daily cycle. Sixteen day composites of imagery are used to eliminate cloud and atmospheric anomalies. This imagery provides an economical and timely dataset to assess changes in landscape cover at broad scales. The 250 metre pixel size limits detailed analysis, but can provide information for assessing general trends in vegetation cover.

The MODIS red band was used as a surrogate for vegetation cover. The approach adopted was to transform the red band to a scaled cover value, similar to the method used for the rangelands of South Australia (Bastin et al. 2007). The spatial scale of the analysis needs careful consideration when reporting on pasture type condition. Mean cover values for a pasture type, either in a large polygon or across a pastoral district, may not adequately represent areas of lower condition. The combination of spatial patterning and histogram analysis can identify areas for further investigation. Histograms can be generated for each pasture type. The method to determine areas that have substantially large areas of low cover was adopted from discussions with the Queensland Department of Natural Resources and Water. This involved determining a threshold value in the histogram cover index, below which all values are deemed to be low vegetative cover or near bare soil of interest for further investigation. Subsequently the sum of all pixels below the threshold is calculated for each selected image and its proportion of the entire histogram given to show low cover / near bare soil.

Figures included for the VRD, Tennant Creek, Northern Alice Springs and Southern Alice Springs Pastoral Districts are a time trace of each pasture type's Estimated Bare Soil Proportion or 'rank' Value (EBSRV) for each image date over each pastoral district. The EBSRV value is plotted on the left Y axis for each image date in the reporting period along the X axis. The Z axis on the right of the plot is that of the sum of monthly rainfall for the pastoral district. The linear trends of both rainfall and EBSRV are also illustrated to give an indication of general trend over the reporting period.

Due to the limited on-ground monitoring undertaken during 2008/09, an assessment of land condition has only been made for the Barkly and Plenty Pastoral Districts. As outlined above, an estimate of bare ground ranking has been made using MODIS satellite imagery for the VRD, Tennant Creek, Northern Alice Springs and Southern Alice Springs Pastoral Districts. Information has been provided based on pasture growth and standing biomass as determined by AussieGRASS models (Australian Grassland and Rangeland Assessment by Spatial Simulation) for the other pastoral districts.

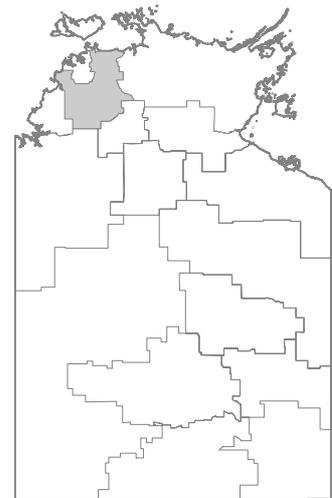
## Darwin Pastoral District Report 2008/09

Rainfall Darwin District	
20 year district average 1257 mm	2008/09 district annual average 1356 mm
20 year district average summer (October to April) 1179 mm	2008/09 district average summer (October to April) 1341 mm
20 year district average winter (May to September) 78 mm	2008/09 district average winter (May to September) 15 mm

The Darwin Pastoral District experienced average to above average rainfall for 2008/09.

No properties in the Darwin Pastoral District were assessed under the monitoring program during 2008/09.

Pasture growth for the district was average to below average from October 2008 to September 2009 as determined by AussieGRASS models. The standing pasture biomass for May 2009 was very low for the Darwin district. This trend of reduced growth and biomass continued through to September 2009 with areas of the Darwin district assessed as having very low levels of standing biomass.



**Figure 1: Location of Darwin Pastoral District**

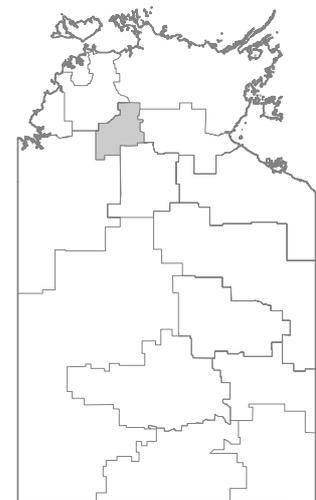
## Katherine Pastoral District Report 2008/09

Rainfall Katherine District	
20 year district average 1075 mm	2008/09 district annual average 1165 mm
20 year district average summer (October to April) 1031 mm	2008/09 district average summer (October to April) 1161 mm
20 year district average winter (May to September) 44 mm	2008/09 district average winter (May to September) 4 mm

The Katherine Pastoral District experienced above average rainfall for 2008/09.

No properties in the Katherine Pastoral District were assessed under the monitoring program during 2008/09.

Pasture growth for the district was above average from October 2008 to September 2009 as determined by AussieGRASS models. The standing pasture biomass for May 2009 was average for the Katherine district. The standing biomass in September 2009 was at very low levels, despite the district experiencing above average pasture growth the season.



**Figure 2: Location of Katherine Pastoral District**

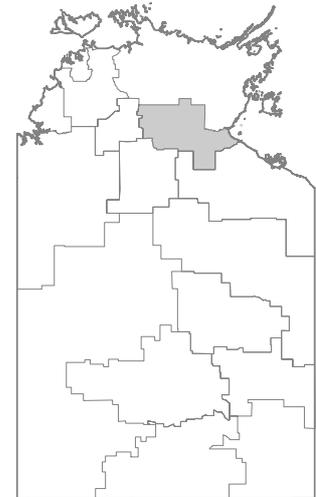
## Roper Pastoral District Report 2008/09

Rainfall Roper District	
20 year district average 961 mm	2008/09 district annual average 1005 mm
20 year district average summer (October to April) 919 mm	2008/09 district average summer (October to April) 1003 mm
20 year district average winter (May to September) 42 mm	2008/09 district average winter (May to September) 2 mm

Parts of the Roper Pastoral District experienced above average rainfall for 2008/09.

No properties in the Roper Pastoral District were assessed under the monitoring program during 2008/09.

Pasture growth for the district was average to below average from October 2008 to September 2009 as determined by AussieGRASS models. The standing pasture biomass for May 2009 was very low for northern areas of the Roper Pastoral District. In September 2009 standing biomass levels had continued to decrease with very low levels in northern and western areas of the district.



**Figure 3: Location of Roper Pastoral District**

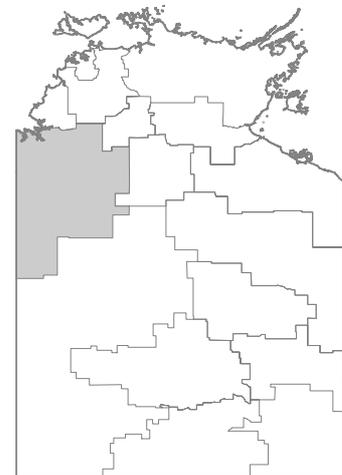
## VRD Pastoral District Report 2008/09

Rainfall VRD District	
20 year district average 783 mm	2008/09 district annual average 759 mm
20 year district average summer (October to April) 745 mm	2008/09 district average summer (October to April) 747 mm
20 year district average winter (May to September) 38 mm	2008/09 district average winter (May to September) 12 mm

Overall, the VRD Pastoral District experienced average rainfall for 2008/09. There were reports of high rainfall within the district, whereas the southern VRD received below average rainfall.

No properties in the VRD Pastoral District were assessed under the monitoring program during 2008/09.

Pasture growth for the northern parts of the district was average to below average as determined by AussieGRASS models. The resulting standing biomass for the district was very low at the end of the wet season and this continued through to September with low levels recorded.



**Figure 4: Location of VRD Pastoral District**

The land type 'Mitchell and other grasses' is pastorally significant within the VRD Pastoral District and has been assessed using MODIS satellite imagery to estimate bare ground ranking (Figure 5). The Mitchell and other grasses land type encompass undulating basalt country, with moderate to gentle slopes and can be very stony in areas. It is mainly comprised of Mitchell and other mid-height grasses including *Astrebala pectinata*, *Dichanthium fecundum* and *Panicum spp.*

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Figure 5 shows that the Mitchell grasslands of the VRD are in a stable condition and responding in an expected fashion to rainfall events producing both biomass and perennial cover. Towards the end of 2008, the bare soil index increases to reflect the senescent vegetation and exposed soil following the removal of annuals. After the rains of the 2008/09 wet season, the bare ground ranking has decreased significantly to reflect the flush of both annual and perennial growth. The two years of available data indicates that the bare ground ranked value is slightly increasing with the corresponding rainfall trend decreasing.

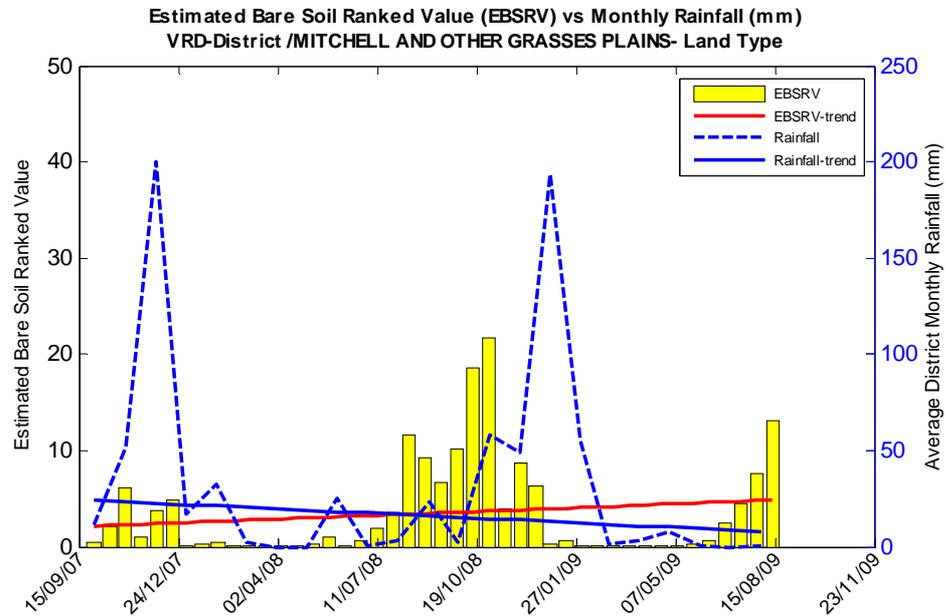


Figure 5: Estimated Bare Soil Ranked Value (EBSRV) vs Monthly Rainfall (mm) for the Mitchell and other grasses land type in the VRD Pastoral District September 2007 – August 2009

## Sturt Plateau Pastoral District Report 2008/09

Rainfall Sturt Plateau District	
20 year district average 795 mm	2008/09 district annual average 622 mm
20 year district average summer (October to April) 762 mm	2008/09 district average summer (October to April) 615 mm
20 year district average winter (May to September) 33mm	2008/09 district average winter (May to September) 7 mm

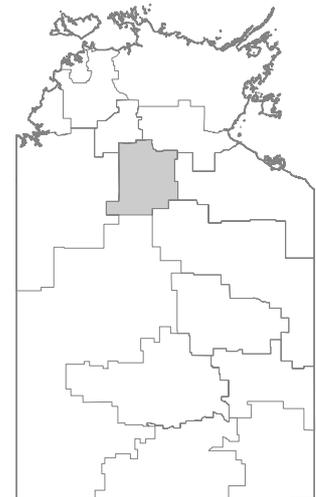


Figure 6: Location of Sturt Plateau Pastoral District

No properties in the Sturt Plateau Pastoral District were assessed under the monitoring program during 2008/09.

During 2008/09 the Sturt Plateau received average rainfall levels with above average pasture growth as determined by AussieGRASS models. The standing biomass levels for both the end of the wet season and the end of the dry season were average to above average.

## Gulf Pastoral District Report 2008/09

Rainfall Gulf District	
20 year district average 788 mm	2008/09 district annual average 464 mm
20 year district average summer (October to April) 749 mm	2008/09 district average summer (October to April) 463 mm
20 year district average winter (May to September) 39 mm	2008/09 district average winter (May to September) 1 mm

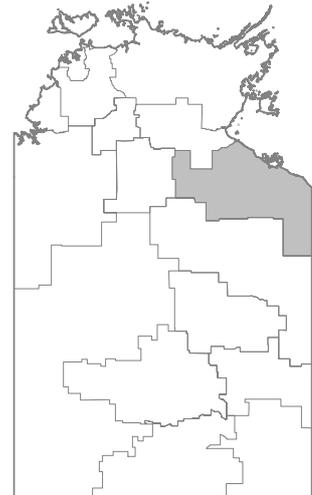


Figure 7: Location of Gulf Pastoral District

No properties in the Gulf Pastoral District were assessed under the monitoring program during 2008/09.

During 2008/09 parts of the Gulf district experienced above average rainfall events. Pasture growth for areas in the northern part of the district was average to below average, with areas in the west of the district having above average growth as determined by AussieGRASS models.

## Barkly Pastoral District Report 2008/09

Land condition in the Barkly Pastoral District is stable.

Rainfall Barkly District	
20 year district average 428 mm	2008/09 district annual average 323 mm
20 year district average summer (October to April) 396 mm	2008/09 district average summer (October to April) 321 mm
20 year district average winter (May to September) 32 mm	2008/09 district average winter (May to September) 2 mm

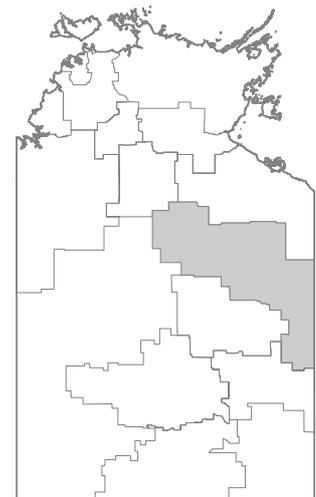


Figure 8: Location of Barkly Pastoral District

The overall rainfall for the region was average, although some areas experienced large rainfall events resulting in extensive flooding.

Tier 1 data collection was undertaken on ten properties in the Barkly Pastoral District during 2008/09 and 122 sites were re-assessed, in the eastern portion of the District. The overall land condition of the sites assessed was considered fair to good (Figure 9).

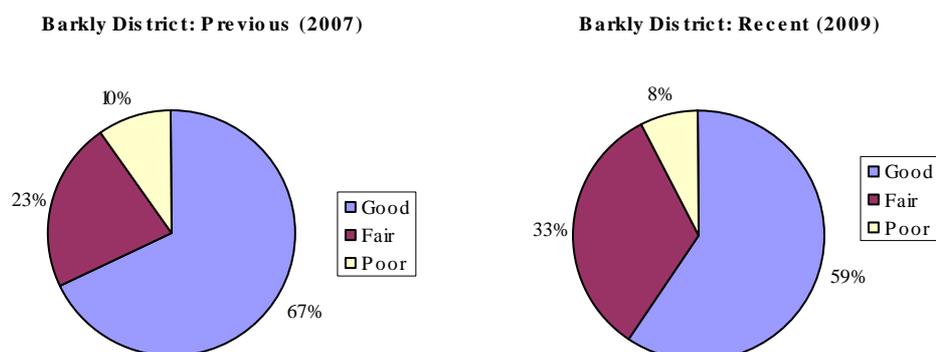
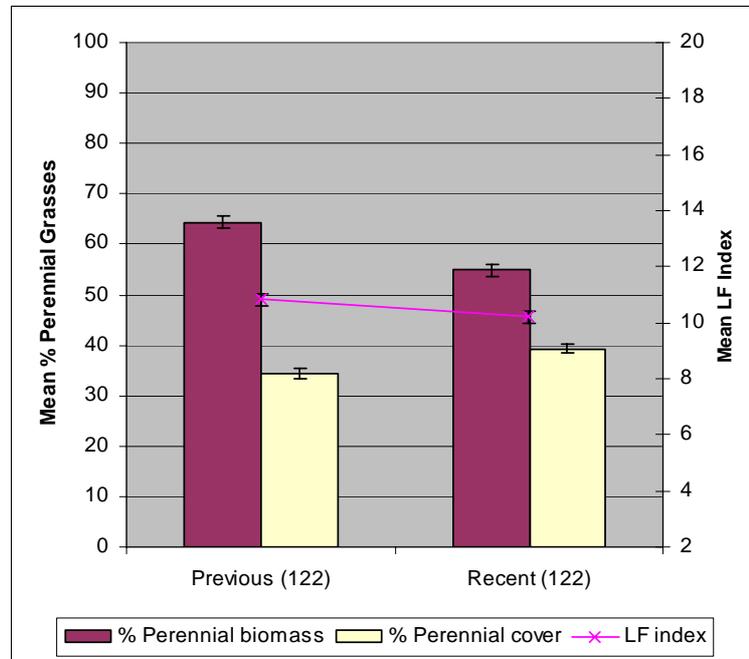


Figure 9: Barkly Pastoral District condition assessed at the previous assessment derived from 122 sites compared to condition assessed at the most recent assessment in 2008/09 derived from the same 122 sites.

# Pastoral Land Board Annual Report 2008/09

Of the sites assessed, the number of good sites decreased from 67% to 59%, fair sites increased from 23% to 33% and poor sites decreased from 10% to 8%.

The landscape function of the sites assessed across the Barkly Pastoral District has declined slightly since the last assessment, as depicted in Figure 10. Perennial biomass of the sites assessed has decreased with perennial cover increasing slightly. The increase of cover and decrease of biomass is a reflection of an increase in annual species, constituting an annual flush after a large rainfall event.

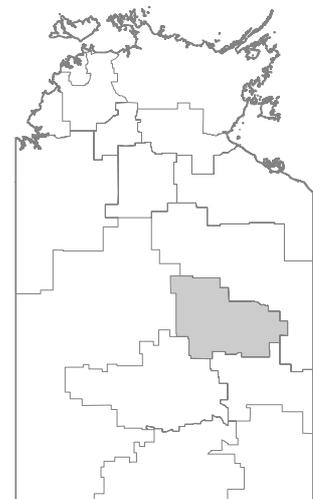


**Figure 10:** Trend of sites assessed within Barkly Pastoral District of mean % perennial biomass, mean % perennial ground cover and mean Landscape Function Index for all properties from previous to most recent assessment in 2008/09.

Overall, the Barkly Pastoral District has remained stable with a slight decline in landscape function even though experiencing below average rainfall for the last three years. This indicates the district is able to respond to rainfall events with a flush of annuals, increasing overall cover. At this stage it is too early to determine the health and response of perennial plants after the large rainfall event.

## Tennant Creek Pastoral District Report 2008/09

Rainfall Tennant Creek District	
20 year district average 346 mm	2008/09 district annual average 264 mm
20 year district average summer (October to April) 309 mm	2008/09 district average summer (October to April) 201 mm
20 year district average winter (May to September) 37 mm	2008/09 district average winter (May to September) 63 mm



**Figure 11:** Location of Tennant Creek Pastoral District

No properties in the Tennant Creek Pastoral District were assessed under the monitoring program during 2008/09.

During 2008/09 the Tennant Creek Pastoral District experienced average rainfall and average pasture growth as determined by AussieGRASS models. Eastern areas of the district experienced very low levels of standing biomass in May 2009 which continued through to September 2009.

# Pastoral Land Board Annual Report 2008/09

Below average standing biomass was recorded for the remaining areas in the district, with the trend of low levels continuing through to September.

The land type ‘short grass forb pastures on flat or gently undulating country’ is pastorally significant within the Tennant Creek Pastoral District and has been assessed using MODIS satellite imagery to estimate bare ground ranking (Figure 12). The short grass forb pastures on flat or gently undulating country land type comprises red and calcareous earths with short grass forb pastures, characterised by grasses after summer rains and forbs after winter rain. There are also woodlands or low edible trees, which during times of drought are sought by stock as top feed.

Figure 12 shows that the land type has very low levels of cover, even after rain events. The graph indicates the land type is quite responsive to rain, with dramatic decreases in the bare ground ranking. From the two years of data available, the bare ground ranking is relatively stable indicating the land type is responding in an expected manner. This is encouraging considering the rainfall data used highlights a decreasing trend and lower rainfall levels. The next factor to be determined is the response of this low vegetation cover landscape at higher levels, but two years of data is not sufficient to make this assessment.

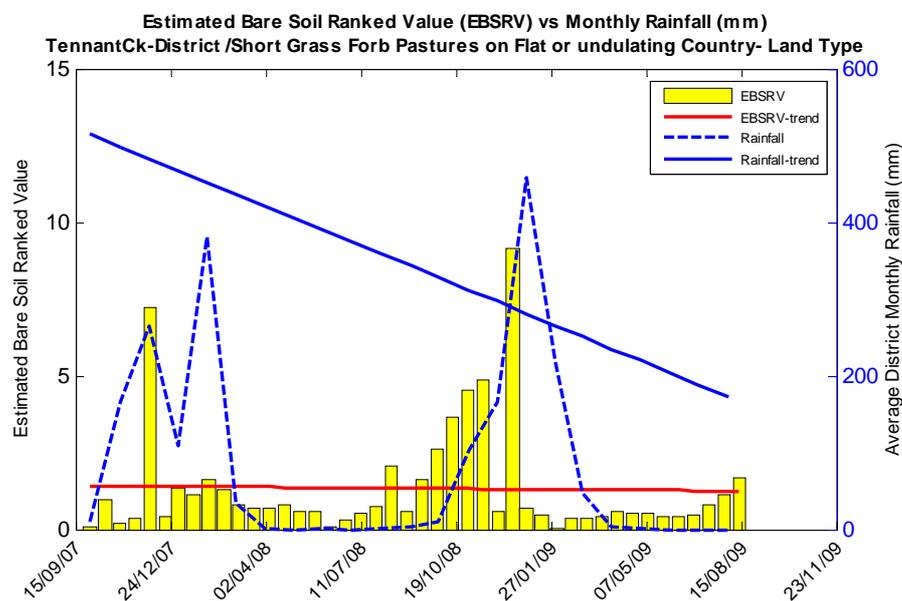


Figure 12: Estimated Bare Soil Ranked Value (EBSRV) vs Monthly Rainfall (mm) for the Short Grass Forb pastures on flat or undulating country in the Tennant Creek Pastoral District September 2007 – August 2009

## Plenty Pastoral District Report 2008/09

Land condition in the Plenty Pastoral District is declining.

Rainfall Plenty District	
20 year district average 248 mm	2008/09 district annual average 76 mm
20 year district average summer (October to April) 201 mm	2008/09 district average summer (October to April) 43 mm
20 year district average winter (May to September) 47 mm	2008/09 district average winter (May to September) 33 mm

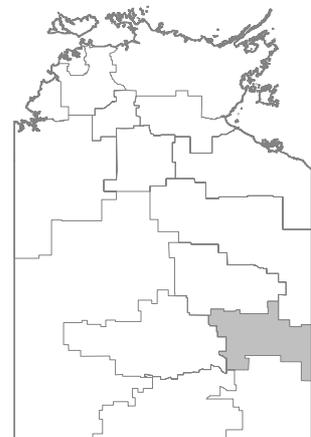
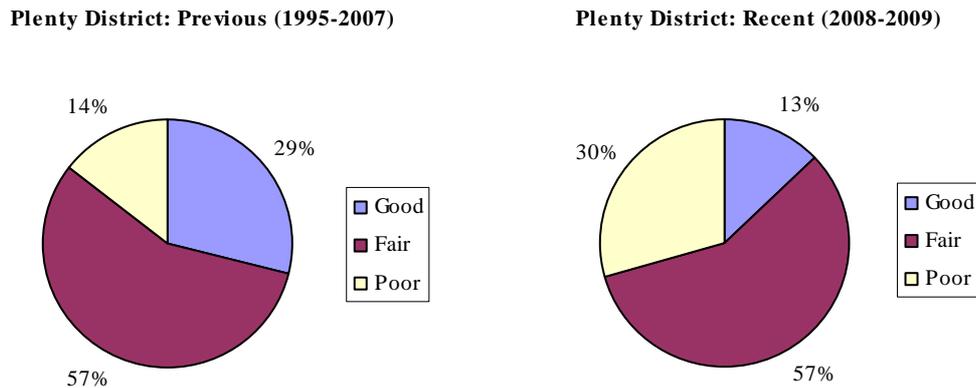


Figure 13: Location of Plenty Pastoral District

Rainfall for the Plenty Pastoral District for 2008/09 was below average with the district receiving less than half of the 20 year average rainfall.

# Pastoral Land Board Annual Report 2008/09

Tier 1 data collection was undertaken on twelve properties in the Plenty Pastoral District during 2008/09 with 132 sites assessed. Low rainfall over most of the district resulted in low cover being recorded at most of the sites assessed. Over half of the sites assessed had a status of fair condition. The biggest change in condition class is the change in status of good to poor. This could be attributed to the low rainfall in the district coupled with previous low rainfall events. As depicted in Figure 14, poor sites increased from 14% to 30% and sites assessed as good condition decreased from 29% to 13%. This significant shift in condition class may be indicative of a system under stress from prolonged below average seasonal condition and management response to adverse conditions.



**Figure 14: Plenty Pastoral District condition assessed at the previous assessment derived from 132 sites compared to condition assessed at the most recent assessment in 2008/09 derived from the same 132 sites.**

From the previous assessment, of the 29% assessed as good condition (38 sites) 10 sites remained stable as good condition, 25 sites changed condition class to fair and 3 sites declined to poor condition. Of the 57% assessed as condition on the previous assessment (75 sites) 49 remained as fair condition, 7 sites improved to good condition and 19 sites declined to poor condition.

Photos 1 and 2 below are examples of the typical condition fair and poor observed across the Plenty District.



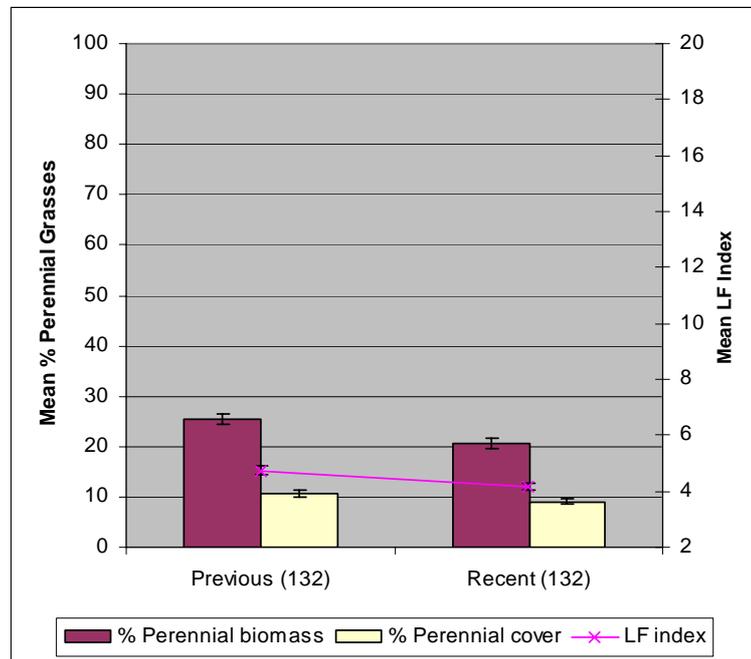
**Photo 1: Tier 1 monitoring site typical of the Plenty District described as fair condition.**



**Photo 2: Tier 1 monitoring site typical of the Plenty District described as poor condition.**

# Pastoral Land Board Annual Report 2008/09

The landscape function of the sites assessed across the Plenty Pastoral District is low and has continued to decline since the last assessment, as depicted in Figure 15. The perennial biomass levels have decreased markedly with the low levels of perennial cover declining further. The reduced cover and low levels of perennial biomass are an indication of effects of the low rainfall from preceding years coupled with the below average rainfall for this reporting period.



**Figure 15:** Trend of sites assessed within the Plenty Pastoral District of mean % perennial biomass, mean % perennial ground cover and mean Landscape Function Index for all properties from previous to most recent assessment in 2008/09.

The continued decline of both pasture biomass and perennial cover across the district is of concern. It was reported and analysed by AussieGRASS models (2007-2008) that the district had very low pasture biomass levels, in the 10 – 20% range.

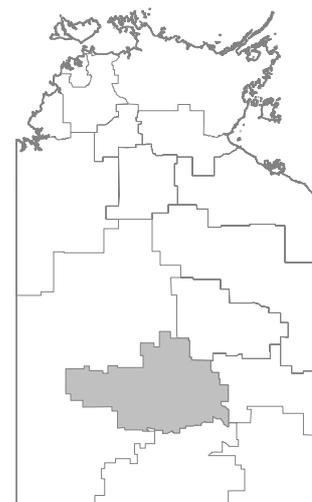
Land condition is also in decline due to the amount of erosion occurring across the district. During monitoring inspections, it was noted on many properties that the size and extent of active and new erosion, mainly from tracks and fence lines, is increasing (see photo 3 on page 19).

## Northern Alice Springs Pastoral District Report 2008/09

Rainfall Northern Alice Springs District	
20 year district average 293 mm	2008/09 district annual average 108 mm
20 year district average summer (October to April) 229 mm	2008/09 district average summer (October to April) 76 mm
20 year district average winter (May to September) 64 mm	2008/09 district average winter (May to September) 32 mm

No properties in the Northern Alice Springs Pastoral District were assessed under the monitoring program during 2008/09.

During 2008/09 below average rainfall was recorded for the Northern Alice Springs Pastoral District, with most of the district experiencing average to below average pasture growth as determined by AussieGRASS models. By the end of September 2009, the district had very low biomass level and cover levels.



**Figure 16:** Location of Northern Alice Springs Pastoral District

# Pastoral Land Board Annual Report 2008/09

The land type ‘short grass forb pastures on flat or gently undulating country’ is pastorally significant within the Northern Alice Springs Pastoral District and has been assessed using MODIS satellite imagery to estimate bare ground ranking (Figure 17). As described in the Tennant Creek Pastoral District, the short grass forb pastures on flat or gently undulating country land type comprises red and calcareous earths with short grass forb pastures, characterised by grasses after summer rains and forbs after winter rain. There are also woodlands or low edible trees, which during times of drought are sought by stock as top feed.

With the data available, the Northern Alice Springs Pastoral District is showing signs of some response to rainfall events. The land type has low levels of cover which has remained stable over the time frame. The bare ground ranking is decreasing slightly over time, indicating a system that has low levels of cover that is remaining stable. The consistent low levels of cover need to be monitored over the coming years to ensure it is able to respond to seasonal conditions.

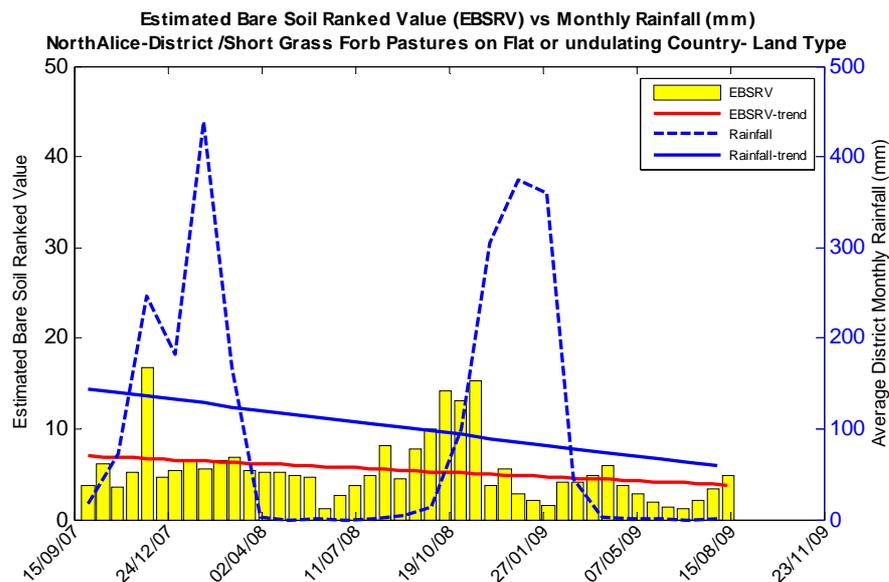


Figure 17: Estimated Bare Soil Ranked Value (EBSRV) vs Monthly Rainfall (mm) for the Short Grass Forb pastures on flat or undulating country in the Northern Alice Springs Pastoral District September 2007 – August 2009

## Southern Alice Springs Pastoral District Report 2008/09

Rainfall Southern Alice Springs District	
20 year district average 204 mm	2008/09 district annual average 120 mm
20 year district average summer (October to April) 144 mm	2008/09 district average summer (October to April) 108 mm
20 year district average winter (May to September) 60 mm	2008/09 district average winter (May to September) 12 mm

No properties in the Southern Alice Springs Pastoral District were assessed under the monitoring program during 2008/09.

During 2008/09 below average rainfall was recorded for the Southern Alice Springs Pastoral District, with most of the district experiencing average pasture growth as determined by AussieGRASS models. By the end of September 2009, the district had very low biomass levels.

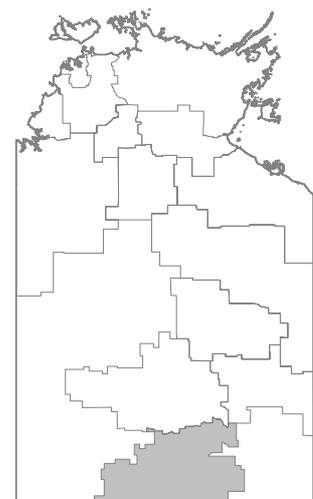
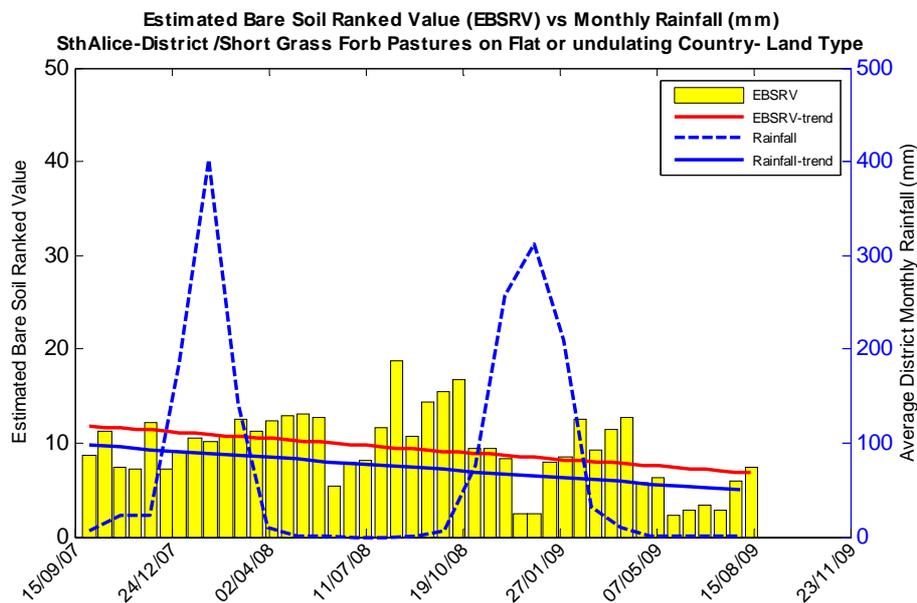


Figure 18: Location of Southern Alice Springs Pastoral District

The land type ‘short grass forb pastures on flat or gently undulating country’ is pastorally significant within the Southern Alice Springs Pastoral District and has been assessed using MODIS satellite imagery to estimate bare ground ranking (Figure 19). As described in the Tennant Creek and Northern Alice Springs Pastoral Districts, the short grass forb pastures on flat or gently undulating country land type comprises red and calcareous earths with short grass forb pastures, characterised by grasses after summer rains and forbs after winter rain. There are also woodlands or low edible trees, which during times of drought are sought by stock as top feed.

With the data available, the Southern Alice Springs Pastoral District is showing responses to rainfall events. The 2007-2008 summer rains were largely received over a three month period resulting in little change to the bare ground ranking. The 2008-2009 summer rains, even though less, were received over a longer time frame. The response to these rains was a reduction in bare ground ranking. These results are yet to be fully ground truthed.

The reduction in bare ground ranking could be a result of a system that has so little ground cover, as reported in previous reports, that any slight increase in cover could skew results. This will be further assessed in the coming years and as more data becomes available the more reliable the trend of change will become. The graph in Figure 19 does indicate the land system is slow to respond to rain events, which has been flagged for further investigation in coming years.



*Figure 19: Estimated Bare Soil Ranked Value (EBSRV) vs Monthly Rainfall (mm) for the Short Grass Forb pastures on flat or undulating country in the Southern Alice Springs Pastoral District September 2007 – August 2009*

## Specific Land Condition Issues

### Implementation of Management Plans to address Land Condition Issues

In cases where specific land condition issues are identified on a pastoral property, the Pastoral Land Board may request the lessee to prepare a management plan detailing the action to be taken to address the land management issues which have been identified. It is a basic tenet of the *Pastoral Land Act* 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 Pastoral Land Board seeks voluntary collaboration with pastoral lessees to address land condition issues and implementation of rehabilitation programs.

During 2008/09 action continued in respect of implementation of management plans on a number of properties throughout the Territory.

## Drought

There were six applications for consideration of drought status from the Alice Springs district in 2008/09 and three properties were declared to be in severe drought.

## Erosion on Roads, Fences and other Infrastructure

Erosion on roads, tracks and fence lines continues to be a significant soil management issue on pastoral leases throughout the Northern Territory. Officers of the Land Resources Branch, NRETAS adopt a co-operative approach to assist station managers with appropriate soil conservation earthwork design and construction. Voluntary management plans have been prepared by pastoral lessees and successfully implemented on a number of properties to address issues arising from the poor siting of infrastructure, and/or inappropriate maintenance techniques.



During 2008/09 Departmental officers noted during monitoring inspections in the Plenty Pastoral District that the size and extent of active and new erosion, mainly from tracks and fence lines, is increasing.

*Photo 3: Historic track erosion in the Plenty Pastoral District.*

## Feral Animals

Large feral vertebrates are a significant problem throughout the Northern Territory as a result of their negative impacts on the agricultural and natural environment. For instance, feral animals have been associated with:

- Declines in the abundance and diversity of native plant communities due to trampling and ingestion of seedlings.
- Increased soil erosion and sedimentation of natural waterways and water bodies as a result of trampling.
- Competition with native species for feed and habitat.
- Consumption of seedlings and plant materials, reducing the capacity for the ecosystem to regenerate.
- Increased spread and establishment of weeds.
- Decreased abundances and diversities of aquatic and terrestrial invertebrates.
- Decreased agricultural productivity by reducing the availability of feed for stock.
- Damage to fences and other infrastructure.

## Feral Animal Control Program – VRD Pastoral District

The VRD feral animal control program has resulted in the removal of large numbers of feral animals. Since its implementation in 1999, a total of 206,283 feral animals have been removed from the region, including 22,440 animals during 2008/09.

In 2008/09, the NT Government received funding from the Commonwealth Government to undertake feral animal management activities in the VRD District. The aim of this program was to reduce feral animal populations by 60% on five properties, as well as to increase community awareness of the damage cause by feral animals. Over 18,000 animals were culled during this program, using both aerial and on-ground methods.

## **Feral Camels in Central Australia**

Feral camels occur in SA, WA, Qld and the NT. Aboriginal settlements in Central Australia and pastoral properties fringing the Simpson, Great Sandy and Tanami Deserts are experiencing increasing problems with feral camels as the size of the camel population increases.

However, the situation south of Alice Springs over the summer of 2006/07 (where tens of thousands of camels moved onto pastoral stations and Aboriginal settlements on search of water) was not repeated in 2008/09.

Current management of feral camels is largely *ad hoc* and has little impact on populations overall. Management falls into four categories- (1) fencing off of key areas, (2) mustering for the purpose of commercial sale, (3) field slaughter for pet meat, and (4) culling (both ground-based and aerial). Feral camels are extremely mobile animals and have been known to cover areas in excess of 3,000 square kilometres in a 12 month period. This together with the fact that feral camels inhabit areas which are remote and sparsely populated makes the design and implementation of management programs difficult.

NRETAS assisted pastoralists and the Central Land Council in the southern NT to shoot feral camels from the air during 2008/09. Under this arrangement, the landholder supplied the helicopter and ammunition and the Parks and Wildlife Service provided an aerial shooter. A total of 1248 camels were aurally culled during 2008/09 and pastoralists continued to shoot camels opportunistically from the ground.

A small number (< 1,000 animals) of feral camels in the NT were mustered and sent to Peterborough for processing in 2009. In Alice Springs, about 30 camels per week are currently being processed for the domestic meat market.

The Desert Knowledge Cooperative Research Centre (DK CRC) research report on the management of camel impacts was released in December 2008. On the basis of this report, the DK CRC developed an Expression of Interest under the Caring For Our Country programme to implement a national programme to manage the impacts of feral camels. The funding bid was successful and the Commonwealth has offered \$19M over four years to implement the project, with aims to remove upwards of 650,000 camels over the next four years.

## **Weeds**

Weeds threaten the sustainability of rural primary industries in the Northern Territory through increased costs, reduced efficiency and limitations on marketing. They also threaten water resources, freshwater fishing, and conservation of the natural environment, recreation, tourism and traditional hunting.

The Weed Management Branch, Department of Natural Resources, Environment, the Arts and Sport assists landholders to manage weeds by providing technical advice, assisting with weed management plans, carrying out surveys and controlling key infestations.

Major weed issues for each pastoral district during 2008/09 are summarised in Table 2 on page 21.

# Pastoral Land Board Annual Report 2008/09

Pastoral District	Main weed issues & control programs
Darwin	<ul style="list-style-type: none"> <li>Mimosa (<i>Mimosa pigra</i>) Mimosa continues to be the major weed impacting on the pastoral industry in the Darwin Pastoral District, with approximately \$1.4 million being spent annually in control programs.</li> <li>Hyptis (<i>Hyptis suaveolens</i>)</li> <li><i>Sida spp</i></li> <li><i>Senna spp</i></li> <li>Gamba grass (<i>Andropogon gayanus</i>)</li> <li>Mission grass (<i>Pennisetum polystachion</i>)</li> <li>Grader grass (<i>Themeda quadrivalvis</i>)</li> </ul>
Katherine	<ul style="list-style-type: none"> <li>Bellyache bush (<i>Jatropha gossypifolia</i>)</li> <li>Mission grasses (<i>Pennisetum polystachion</i>)</li> <li>Parkinsonia (<i>Parkinsonia aculeata</i>)</li> <li>Grader grass (<i>Themeda quadrivalvis</i>) This species is rapidly emerging as a serious weed issue.</li> </ul>
Roper	<ul style="list-style-type: none"> <li>Bellyache bush (<i>Jatropha gossypifolia</i>)</li> <li>Lantana (<i>Lantana spp.</i>)</li> <li>Mimosa (<i>Mimosa pigra</i>)</li> <li>Grader grass (<i>Themeda quadrivalvis</i>) This species is rapidly emerging as a serious weed issue.</li> <li>Parkinsonia (<i>Parkinsonia aculeata</i>)</li> </ul>
VRD	<ul style="list-style-type: none"> <li>Bellyache bush (<i>Jatropha gossypifolia</i>)</li> <li>Mimosa (<i>Mimosa pigra</i>)</li> <li>Parkinsonia (<i>Parkinsonia aculeata</i>)</li> <li>Prickly Acacia (<i>Acacia nilotica</i>)</li> <li>Grader grass (<i>Themeda quadrivalvis</i>) This species is rapidly emerging as a serious weed issue.</li> </ul>
Sturt Plateau	<ul style="list-style-type: none"> <li>Bellyache bush (<i>Jatropha gossypifolia</i>)</li> </ul>
Gulf	<ul style="list-style-type: none"> <li>Bellyache bush (<i>Jatropha gossypifolia</i>)</li> <li>Prickly Acacia (<i>Acacia nilotica</i>)</li> </ul>
Barkly	<ul style="list-style-type: none"> <li>Mesquite (<i>Prosopis spp.</i>)</li> <li>Parkinsonia (<i>Parkinsonia aculeata</i>)</li> <li>Prickly Acacia (<i>Acacia nilotica</i>)</li> <li>Rubber Bush (<i>Calotropis procera</i>)</li> </ul>
Tennant Creek	<ul style="list-style-type: none"> <li>Bellyache bush (<i>Jatropha gossypifolia</i>)</li> <li>Parkinsonia (<i>Parkinsonia aculeata</i>)</li> <li>Rubber Bush (<i>Calotropis procera</i>)</li> </ul>
Plenty	<ul style="list-style-type: none"> <li>Parkinsonia (<i>Parkinsonia aculeata</i>)</li> <li>Rubber Bush (<i>Calotropis procera</i>)</li> </ul>
Northern Alice Springs	<ul style="list-style-type: none"> <li>Athel Pine (<i>Tamarix aphylla</i>) Athel pine is principally located south of Alice Springs along the Finke River catchment. Mature athel pine trees have been controlled north of Alice Springs.</li> </ul>
Southern Alice Springs	<ul style="list-style-type: none"> <li>Athel Pine (<i>Tamarix aphylla</i>)</li> </ul>

Table 2: Weed Issues in NT Pastoral Districts 2008/09

## Value of the Cattle Industry to the Northern Territory

The pastoral estate of the Northern Territory covers around 606,000 km<sup>2</sup> comprising 45% of the area of the Northern Territory under 221 pastoral leases. Pastoral holdings vary from small stations of 198 km<sup>2</sup> to the Territory's largest station, which runs cattle over 12,212 km<sup>2</sup>.

The estimated gross value of production from the NT cattle industry in 2007/08 was \$323.8 million, a 52% increase compared to the previous year. This was mainly due to an increase in both the value of live cattle exports and the value of cattle movements interstate. In 2008/09 there was an estimated 6.2% increase in cattle production value to \$343.8 million.

Cattle contributed 48.2% of the total value of Territory rural industries and fisheries production in 2007/08.

The NT cattle industry's value adding contribution to NT Gross State Product in 2007/08 is estimated to be \$197.8 million. The flow-on effects of the pastoral industry on the NT economy are estimated to be \$265.6 million.

In 2007/08 an estimated 646,897 head of cattle were turned off from the Territory pastoral properties, an increase of 51.8% on 2006/07. Of the total NT cattle turned off, 54.72% went interstate and 45.3% were exported overseas live. No cattle were slaughtered as there is no longer an abattoir operating in the NT. The interstate demand for cattle was significant in 2007/08 due to continuing drought conditions in Queensland, NSW, WA and SA. More recent figures for NT live cattle exports through the Port of Darwin show that in 2008/09 an estimated 317,588 head of NT cattle were exported, an increase of 8.3% compared to 2007/08.

## Applications considered by the Board during 2008/09

### Applications to clear Pastoral Land 2008/09

#### (i) Clearing applications approved 2008/09 – Purpose and Areas

Purpose of clearing	Number of proposals	Area approved
Introduced pastures/hay production	1	82 ha
<b>Totals</b>	<b>1</b>	<b>82 ha</b>

Table 3: Purpose and areas of pastoral land clearing approved 2008/09

#### (ii) Applications to clear Pastoral Land 2008/09

Applications carried over from 2007/08	4
Total number of clearing applications lodged 2008/09	2
Applications approved	1
Applications withdrawn	2
Applications held in abeyance pending formal assessment under the <i>Environmental Assessment Act</i>	2
<b>Active Applications carried over</b>	<b>1</b>

Table 4: Clearing applications determined 2008/09

## Applications for Non Pastoral Use 2008/09

### (i) Applications for non pastoral use 2008/09

Applications carried over from 2007/08	1
Applications lodged during 2008/09	14
Applications approved	11
Applications lapsed/withdrawn	1
<b>Applications carried over</b>	<b>3</b>

*Table 5: Applications for non pastoral use determined 2008/09*

### (ii) Purpose of non pastoral use approvals 2008/09

Non Pastoral Use Activity	No. of Approvals
Tourism	6
Horticulture	3
Store	1
Mining rehabilitation	1

*Table 6: Purpose of non pastoral use approvals 2008/09*

## Applications to Subdivide a Pastoral Lease into two or more Pastoral Leases 2008/09

Applications carried over from 2007/08	2
Applications referred 2008/09	2
Applications considered by the Board with recommendation to the Minister	2
Applications held in abeyance at lessee's request	1
<b>Applications carried over</b>	<b>1</b>

*Table 7: Subdivision applications considered 2008/09*

## Applications to surrender Term Pastoral Leases in exchange for Perpetual Pastoral Leases 2008/09

Applications carried over from 2007/08	2
Applications referred 2008/09	3
Applications considered by the Board with recommendation to the Minister	2
<b>Applications carried over</b>	<b>3</b>

*Table 8: Applications to convert to perpetual tenure considered 2008/09*

## Report on Land Clearing previously approved

It is a requirement of the *Pastoral Land Act* that a lessee shall not undertake clearing on pastoral land without the written consent of the Pastoral Land Board. The Pastoral Land Board has included details of the number of clearing applications and purpose of land clearing approvals in each of its Annual Reports to the Minister since 1992/93. Since 1999/2000, the Board has also reported on progress with previous land clearing approvals. Table 9 below outlines whether clearing has proceeded and current status for determinations of the Board since the last report.

Year	Clearing Purpose	Area	Status at 30/9/2009
2005/06	Introduced pastures & hay production	439 ha	Clearing never commenced. Approval lapsed 2008/09.
2005/06	Selective clearing to reduce shrub dominance	420 ha	Clearing never commenced. Approval lapsed 2008/09.
2006/07	Clearing of regrowth	852 ha	Clearing commenced. Not completed
2006/07	Clearing of regrowth	1003 ha	Clearing commenced. Not completed
2006/07	Introduced pasture & hay production	170 ha	Clearing commenced. Not completed
2006/07	Introduced pasture for grazing	1438 ha	Clearing completed.
2006/07	Introduced pasture for grazing	232.2 ha	Clearing commenced. Not completed
2006/07	Introduced pasture for grazing	924 ha	Clearing commenced. Not completed
2007/08	Introduced pasture for grazing	1304 ha	Clearing commenced.
2007/08	Introduced pasture for grazing	885 ha	Clearing completed.
2007/08	Introduced pasture for grazing	1613 ha	Clearing commenced.
2007/08	Introduced pasture for grazing	911 ha	Clearing not yet commenced.

*Table 9: Status of land clearing previously approved*