

State Rural Leasehold Land Strategy

Guidelines for determining land condition

Version 3.0
July 2013

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Version 3.0—July 2013

First published February 2009 (Version 1.0)

ISBN 9 311662 181114

CS2580 7/13

Acknowledgements

The guidelines were developed by a technical working group comprising experts in the fields of soil science, grazing management, resource mapping, land condition assessment and biodiversity, and drawn from the Department of Natural Resources and Mines (DNRM), the Department of Agriculture, Fisheries and Forestry (DAFF) and the Department of Science, Information Technology, Innovation and the Arts (DSITIA).

In addition, advice was sought on particular issues from independent experts.

The technical working group met fifteen times and went on five field trips over a two-year period to develop, test and refine the indicators and the methodology set out in the guidelines.

In addition, the appropriateness of the guidelines has been evaluated and endorsed by members of the State Rural Leasehold Land Ministerial Advisory Committee, who were appointed on 1 August 2008 by the then Minister for Natural Resources and Water, pursuant to section 394(2) of the *Land Act 1994*.

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Part 1

About the guidelines

1. Background

For more than a decade, successive state governments in Queensland have progressively reviewed and changed the way in which State-owned land, including rural leasehold land, is administered and managed. Initiatives such as the State Rural Leasehold Land Strategy have placed significant emphasis on addressing land use and management practices in order to secure the economic, social and environmental values of State rural leasehold land over the long term.

The State Rural Leasehold Land Strategy has established a cooperative land management system through which the Queensland Government can collaborate with rural lessees to ensure that natural resources are sustainably managed and profitable primary production is safeguarded. The Strategy focuses on land leased for agricultural, grazing or pastoral purposes for a term of 20 years or more, and covering no less than 1000 hectares. Approximately 1550 rural leases are affected, covering 86 million hectares or half of Queensland. Approximately 96.3 per cent of the rural leasehold land to which the Strategy applies is mapped as remnant vegetation by the Queensland Herbarium.

The legal framework for the new management system came into effect on 1 January 2008 under the *Land Act 1994*. The guidelines, which have been developed in accordance with the provisions of section 394A of that Act, advance the implementation of the State Rural Leasehold Land Strategy.

As provided under section 394A(2) of the Act, the Minister has sought advice on the appropriateness of the guidelines from the State Rural Leasehold Land Ministerial Advisory Committee, which is an advisory committee established under the provisions of section 394(1) and in accordance with the terms of the State Rural Leasehold Land Strategy.

These guidelines may be reviewed at the discretion of the Minister administering the *Land Act 1994* to ensure assessment integrity is maintained in line with the evolution of scientific knowledge and best practice land management principles.

1.1 Purpose

The *Guidelines for determining land condition* (the guidelines) will be used by the Department of Natural Resources and Mines (DNRM) to determine whether lease land used for livestock grazing or agricultural purposes is in 'good condition'.

The guidelines have been prepared for use by technical officers undertaking the initial land condition assessments required at lease renewal, under the provisions of sections 155, 155AA, 155A, 155B, 155D and 159 of the *Land Act 1994*. They are not intended to form the basis of a lessee monitoring program, but may be a useful reference tool for lessees seeking to maintain or improve the condition of their land in accordance with the requirements of a land management agreement (section 176V(c)).

Follow-up assessments such as the 10-year reassessments conducted in accordance with the requirements of section 176X (*Reviewing a land management agreement*) will occur at the same sites, using the process stipulated in the guidelines or, if revised, the then current version of the guidelines.

The guidelines may also be used as a tool to determine land condition for compliance purposes on leases to which the State Rural Leasehold Land Strategy does not apply (e.g. leases less than 1000 hectares).

1.2 Scope

It is a requirement of the Land Act that certain leases be subject to condition assessments. In accordance with sections 155, 155AA, 155A, 155B, 155D, 159, 160A, 162A, 167 and 176V of the *Land Act 1994*, the guidelines apply to all leases over rural leasehold land:

- granted for agricultural, grazing or pastoral purposes
- with a term of 20 years or more
- covering an area of 1000 hectares or more.

In schedule 6 of the Land Act 1994, ‘rural leasehold land’ is defined as:

...land for which leases may be used in perpetuity or for a term of years for agricultural, grazing or pastoral purposes, other than land in any of the following:

- (a) a reserve;
- (b) a State forest;
- (c) a timber reserve;
- (d) any of the following under the Nature Conservation Act 1992—
 - (i) a national park (scientific);
 - (ii) a national park;
 - (iii) a national park (Aboriginal land);
 - (iv) a national park (Torres Strait Islander land);
 - (v) a national park (Cape York Peninsula Aboriginal land);
 - (vi) a national park (recovery);
 - (vii) a conservation park;
 - (viii) a resources reserve;
 - (ix) a forest reserve.

1.3 Principles

Like the terms of the State Rural Leasehold Land Strategy, the land condition assessment guidelines build on the principles of the *Land Act 1994*, including the statutory duty of care and provisions relating to land degradation.

1.3.1 Objects of the Land Act 1994

Section 4 of the Land Act identifies the objects of the statute and stipulates the principles governing the administration of the Act and the management of the state’s land resource—namely: sustainability, evaluation, development, community purpose, protection, consultation and administration.

Accordingly, the land condition assessment guidelines have been developed with reference to these prescribed principles and in accordance with other relevant provisions of the Land Act—in particular, section 199 *Duty of care condition*.

(See also Appendix A)

1.3.2 Duty of care

Under section 199 of the *Land Act 1994*, every lessee must take ‘all reasonable steps’ to satisfy their duty of care for the lease land. Specifically, a lessee of rural leasehold land must take all reasonable steps to:

- (a) avoid causing or contributing to land salinity that reduces its productivity or damages any other land
- (b) conserve soil
- (c) conserve water resources
- (d) protect riparian vegetation
- (e) maintain pastures dominated by perennial and productive species
- (f) maintain native grassland free of encroachment from woody vegetation
- (g) manage any declared pest
- (h) conserve biodiversity.

The land condition assessment procedure detailed in these guidelines is based on the premise that if a lessee is taking all reasonable steps to discharge this obligation, the lease land is more likely to be in good condition.

1.3.3 Land degradation

As defined in schedule 6 of the *Land Act 1994*, land degradation includes any of the following:

- (a) soil erosion, salinity or scalding
- (b) destruction of soil structure, including, for example, the loss of fertility, organic matter or nutrients
- (c) decline in perennial pasture grasses, pasture composition and density
- (d) low ground cover

- (e) thickening in woody plants
- (f) stream bank instability and slumping
- (g) the presence of any declared pest
- (h) water logging
- (i) rising water tables
- (j) a process that results in declining water quality.

The land condition assessment process involves identifying land degradation issues on a lease; although it is acknowledged that there may be some land degradation issues present (e.g. naturally occurring soil erosion) even when the duty of care has been satisfied.

1.3.4 Principles for evaluating appropriateness of the draft guidelines

Members of the State Rural Leasehold Land Ministerial Advisory Committee identified and agreed to the principles outlined in Appendix B as the criteria against which they would evaluate the ‘appropriateness’ of the guidelines (s. 394A(2)).

1.4 Approach

The guidelines set out a procedure that includes a desktop assessment and field assessment of lease land (see Part 2). The purpose of the desktop assessment is to collate and analyse all relevant documents and data pertaining to the lease, and to prepare and plan for the field assessment. The purpose of the field assessment is to assess the condition of all accessible parts of the lease land in terms of the land condition attributes listed in 1.4.1 below.

A determination on the land condition relates to the lease as a whole, and is made on the basis of the information reviewed during the desktop assessment, the data collected, and observations made during the field assessment.

1.4.1 Land condition attributes

The guidelines refer to the following **attributes** of land condition, which are a subset of the duty of care principles:

- pasture
- soil
- biodiversity
- declared pests
- salinity
- riparian vegetation
- natural water resources.

1.4.2 Rationale

The condition assessment method used in the guidelines is intended to provide a snapshot of the condition of a lease land parcel at a point-in-time. It involves an assessment of each of the above-listed attributes across all accessible parts.

The condition of the pasture, soil and biodiversity attributes are the primary determinants of lease land condition as these attributes are considered to reflect land management practices. While pasture, soil and biodiversity are key, the other four attributes (declared pests, salinity, riparian vegetation and natural water resources) are critical for long term sustainability. Consequently these attributes will also be assessed, their condition reported to the leaseholder and any issues addressed in the land management agreement for the lease.

As biodiversity is defined as the variety of types of organisms living within an area, it is not possible to directly assess more than a small number of components² of biodiversity. Under the guidelines, the assessment of biodiversity uses some indicators of the other attributes but is also supplemented with indicators that are exclusively for the purpose of biodiversity. Table 1 shows the indicators that are exclusively for biodiversity, those that are exclusively for productivity, and those that are indicators of both productivity and biodiversity. The indicators that are exclusively for the purpose of biodiversity are an abridged version of the methodology set out in DSITIA’s BioCondition methodology³.

To ensure the Department has an accurate representation of the condition of biodiversity across the leasehold estate, all biodiversity indicators are assessed at all sites. However, for the determination of whether a lease is in good condition; an adjusted biodiversity score is used. The adjusted biodiversity score does not include the results of some indicators at developed sites. This ensures that lessees are not penalised for having undertaken lawful land management practices, such as tree clearing or sowing of improved pastures.

Whether native grasslands are free of encroachment from woody vegetation is not explicitly assessed in the process, but is taken into account through: the assessment of biodiversity, the desktop process and field observations.

It is worth noting that other organisations have developed tools and methodologies for assessing specific attributes (e.g. soil, salinity, biodiversity, riparian vegetation), some of which provide a more detailed study of the particular attribute than that provided in the guidelines and may therefore be more appropriate for determining that attribute's condition.

1.5 Review process

To ensure fair, consistent and transparent application of these guidelines, where a leaseholder does not agree with an assessment determination that describes their lease as not in good condition, they will be afforded an opportunity to make application for review in accordance with the department's internal review policies for rural leasehold land leases.

1.6 Using the guidelines

Refer to the glossary for definitions of terms used in these guidelines. (For ease of reference, where a defined term is used in the text, it is underlined or there is a reference to the glossary.)

² Kutt and Fisher 2007

³ BioCondition: a terrestrial vegetation condition assessment tool for biodiversity in Queensland: field assessment manual Version 2.1

Table 1. Indicators of grazing, agricultural and pastoral production, and biodiversity

Indicator	Grazing, agricultural and pastoral production	Biodiversity
Proportion of preferred species	✓	X / ✓*
Density of preferred species	✓	X / ✓*
Proportion of intermediate (and preferred) species	✓	X / ✓*
Density of intermediate (and preferred) species	✓	X / ✓*
Health of preferred and intermediate species	✓	X / ✓*
Proportion of non-preferred species	X	✓
Density of non-preferred species	X	✓
Soil surface condition	✓	✓
Ground cover	✓	✓
Declared pest plants	✓	✓
Declared pest animals	✓	✓
Proportion of native ground layer species	✓	✓
Density of native ground layer species	✓	✓
Large trees	X	✓
Shrub layer	✓	✓
Woody debris and litter	X	✓
Recruitment of woody perennial species	X	✓
Non-native species – excluding declared pest plants	X	✓
Size of patch	X	✓
Salinity	✓	✓
Riparian area disturbance	X	✓
Bank instability	X	✓
Potential soil erosion [^]	✓	X

* If the preferred species are native, the indicator is an indicator of biodiversity (✓). If the preferred species are exotic, it is not an indicator of biodiversity (X).

[^] Potential soil erosion is an indicator of soil for sites in the recently mechanically disturbed stratum.

Part 2

Assessment procedure

2. Desktop assessment

2.1 Lessee contact

Advise the lessee that the lease renewal process is at the land condition assessment stage. (A record should be kept of this contact.) Forward information about the lease renewal process, the land condition assessment and land management agreements to the lessee (unless it has already been provided).

Ask whether there is already an established property management plan and/or a monitoring program for the lease land. If there is, explain that such information is useful to DNRM to assist in assessing the condition of the lease land and in developing the land management agreement, and encourage the lessee to make it available at some point in the process.

2.2 Data compilation and analysis

If multiple leases are managed as part of an enterprise or aggregation, the leases can be assessed consecutively. In this case, apply the land condition assessment process, as set out in Parts 2-6 of the guidelines, to each separate lease in the enterprise or aggregation.

Compile relevant data layers, such as:

- land type mapping, if available
- regional ecosystem mapping
- recent and historic imagery (satellite and aerial photography)
- topography
- drainage lines
- WARLUS or other land systems mapping
- ground cover index (GCI), including maps showing the maximum, mean and minimum ground cover over the lease land and the region
- land use mapping
- infrastructure mapping, if available
- other data available in the region or required for the particular lease.

Using these digital data layers, identify:

- any areas of interest e.g. unusually high or low ground cover relative to surroundings, and degraded areas (scalds, pest outbreaks, gullies, etc.). These areas may not necessarily be 'sites' that are assessed and contribute to the lease score; however they may be assessed if accessible to determine if there are any degradation issues that need to be addressed in the land management agreement
- infrastructure, including access tracks, bores, fences, sheds, dams, windmills, watering points, using any existing infrastructure datasets, satellite imagery, GCI maximum and minimum ground cover products and lessee and/or third party mapping or advice. Identification of infrastructure is required to:
 - gain an understanding of how the lease is managed
 - identify areas of the lease that may be accessed and assessed
 - identify potential monitoring locations (post-assessment)
- any areas where there has been recent (within the last 12 months) mechanical disturbance (e.g. cropping and blade ploughing)
- any areas of native grasslands where encroachment of woody vegetation has occurred (using historical and recent imagery), as encroachment of woody vegetation onto native grasslands is a land degradation issue that must be addressed in the land management agreement.

Review the lease file to:

- assist in the identification of infrastructure
- determine if there are any current departmental actions associated with the lease to be aware of before contacting the lessee or going on the field assessment
- ascertain DNRM's advice about the lease land
- ascertain whether significant soil erosion has previously been identified on the lease.

Follow the *Aboriginal cultural heritage guideline* and the *Guideline for uncapped bores*.

2.3 Lease land stratification

To map land types, use the look-up tables developed by DNRM that match **regional ecosystems to land types**. If the regional ecosystem mapping for the lease land consists of ‘mixed polygons’ (i.e. one polygon contains a number of regional ecosystems at specified percentages), proportionally allocate the contribution of each regional ecosystem to a land type to accurately determine the percentage area of land types on the lease.

Determine the percentage that each land type contributes to the total lease land. If the recently mechanically disturbed stratum or any land type (except any **alluvial land type**) makes up less than 10 per cent of the lease land they are ascribed to a ‘too small stratum’ which may not be sampled. However, if the ‘too small stratum’ makes up more than 30 per cent of the lease land, progressively reduce the cut-off percentage of the too small stratum from 10 per cent by 0.1 per cent each time until the too small stratum makes up less than 30 per cent of the lease land.

Any alluvial land types are identified, mapped and assessed (if accessible) irrespective of the percentage area contribution to the lease.

Using Regional Ecosystem mapping, determine the proportion of each land type that is remnant/non-remnant vegetation.

Using recent satellite imagery and/or aerial photography or lessee advice, determine any areas that have recently been mechanically disturbed. These areas make up the **‘recently mechanically disturbed stratum’**.

2.4 Site allocation process

Use the following process to allocate assessment sites.

1. In consultation with the lessee, determine the location of infrastructure on the lease land and the access tracks.
2. To achieve the sampling of three riparian sites across the lease land, it may be necessary to ‘target’ riparian sites by overlaying and intersecting open access tracks, the statewide 1:100000 drainage line dataset, recent satellite imagery, and the alluvial stratum, to determine accessible riparian areas. Allocate at least three riparian sites across the lease land, upstream of access tracks (if the track crosses the drainage line), on the drainage line and 100 metres from an access track.
3. Using the SiteGen tool, buffer all open access tracks with a 200 metre buffer each side of the track.
4. Within the buffered area, randomly locate points using the GIS SiteGen tool according to the following rules:
 - (a) Each lease land must have the minimum number of sites for the lease size, as listed in Table 2.
 - (b) If a stratum is less than 10 per cent of the total lease land it does not have to be assessed unless the stratum is an alluvial land type.
 - (c) Each stratum must have at least 3 sites; unless it is a ‘too small’ stratum or the land type is not large enough for 3 sites.
 - (d) Within each stratum, sites must be proportionally allocated to areas mapped as remnant and non-remnant vegetation in proportion to the per cent of the land type mapped as remnant/non-remnant vegetation.
 - (e) In accordance with the above rules, plot sites randomly whilst ensuring sites are more than:
 - 300 metres from a stockyard, watering point, homestead, bore drain or, shed, mine site, gas/oil well, lick point, water body
 - 100 metres from a gate
 - 25 metres from a fence, road, track, powerline, railway, pipeline, closed track or road, or old fenceline.
 - (f) Further, a site is considered unsuitable to rate (but will still be observed to determine if there are any issues that may need to be addressed in the land management agreement) if either:
 - the site is within a holding paddock or laneway
 - the site has been very recently burnt and the pasture has not yet responded
 - the site is a land type transition area
 - the site has greater than 50 per cent bedrock exposed at the surface.
5. Where the total number of sites for the lease land is greater than the total amount required for all strata on the lease, the extra sites are allocated to the accessible strata in proportion to their area (and in accordance with 2.4 (4)(d)). If after the proportional allocation of sites, the number of sites for a stratum exceeds 10 sites, then this number will be reduced to 10 sites.

6. Any **inaccessible stratum** will not be assessed, so sites are not required in these areas.
7. If a site falls in a ‘mixed’ regional ecosystem polygon, it may not be possible to determine at the desktop if the site is the expected land type. During the field assessment, the site will be assessed and rated, and if it is not the targeted land type, an additional site will be created in the targeted land type (in the same polygon if possible). If the number of sites in a land type is less than that required per stratum in Table 2 (due to mixed polygons and parts of the polygon being distant from access), the minimum number of sites may be reduced.
8. If a site falls on a land type that is not expected on the lease, and the land type is estimated to be greater than 20 hectares (by examination of imagery) the site will be rated. If the unexpected land type is subsequently determined to represent 10 per cent or more of the area of the lease, the ratings will be taken into account in the lease scores.

Table 2: Minimum number of sites assessed per lease (and further observations)

Area of lease land (hectares)	Minimum number of sites assessed per lease
1000–3000	10 or 3 per stratum whichever is greater
3001–5000	15* or 3 per stratum whichever is greater
5001–20 000	20* or 3 per stratum whichever is greater
20 001–50 000	30* or 3 per stratum whichever is greater
>50 000	40* or 3 per stratum whichever is greater

* Note that under section 2.4.5, a stratum cannot be allocated more than ten sites. Accordingly, the total number of sites required by the lease area (15, 20, 30 and 40) may be reduced if a stratum has ten sites.

2.5 Contextual data analysis

Prior to conducting a field assessment, the following datasets may also be analysed.

- AussieGRASS pasture growth and rainfall percentiles for the region over the previous 24 and 12 month periods—these will provide an indication of whether the region of the lease has been experiencing good, poor or average conditions
- AussieGRASS sub-Interim Biogeographical Regionalisation of Australia (sub-IBRA) time series for pasture growth and rainfall—these graphs set out the monthly and yearly averages of rainfall, pasture growth and modelled ground cover, thus showing the range of conditions in the region over time, giving context to current conditions and indicating historical degradation events
- Ground cover index (GCI) maximum, minimum and mean products at a regional scale—these products allow a comparison of remotely sensed ground cover of the same land types on different leases in the region
- Ground cover index (GCI) graph of cumulative 1 in 20 year minimum ground cover for a particular land type—this allows further analysis of the ground cover of the same land types on different leases in the region
- FORAGE rainfall and pasture report for the lease land—this information provides information about the long term trend, variability and current situation of rainfall and pasture growth on the lease land
- FORAGE ground cover report for the lease land—this information provides a comparison of pasture growth and ground cover (remotely sensed and modelled) with rainfall over the time period. This allows an analysis of how climate variability has influenced pasture growth and ground cover, and whether low ground cover at a particular time is potentially caused by climate or management practices.

When analysing these datasets, consideration should be given to whether it appears that there is significant soil erosion over the lease land.

2.6 Field assessment preparation

Contact the lessee to set a mutually convenient date to assess the lease land.

Invite the lessee to participate in the field assessment, or encourage the lessee to be present for at least part of the field assessment.

Prepare maps or digital layers of the lease land for use during the site assessment, showing:

- assessment sites, other areas of interest (e.g. areas of possible land degradation)
- areas identified as having significant natural and environmental values
- the digital cadastral database

- regional ecosystems
- remnant vegetation
- land types
- imagery
- GCI
- infrastructure
- watercourses
- soils
- land systems.

3 Field assessment

3.1 Process

The field assessment involves:

1. Visiting areas of interest that were identified during the desktop analysis or the lease referral process, for:
 - (a) s.176V of the Land Act *Purposes of a land management agreement*
 - (b) s.159 of the Land Act *General provisions for deciding application*.

Areas of interest are discussed in more detail in section 3.2.

2. Conducting site assessments — this process is detailed in Part 2 section 4 of the guidelines. (Section 5 ‘Indicators for sites in the land type strata’; Section 6 ‘Indicators for sites in riparian areas’; and Section 7 ‘Indicators for sites in the recently mechanically disturbed stratum’ apply to site assessments.)
3. Identifying any parts of the lease land that are additional areas of interest (that were not identified during the desktop analysis or lease referral process) while traversing the lease land to sites or areas of interest.

The procedure for conducting site assessments is set out in section 4, and the indicators for site assessments are set out in sections 5, 6 and 7.

3.2 Areas of interest

Wherever practical and accessible, visit areas of interest that were identified during the desktop analysis or the lease referral process, including areas where:

- there are known Indigenous and other cultural heritage values
- there are known significant natural environmental values
- there may be significant land degradation issues (such as declared pests, salinity, soil erosion, scalding, thickening of regional ecosystems, or stream bank instability or slumping) as identified by a database or remote sensing product (what constitutes ‘significant’ land degradation varies from lease to lease.)
- there may be an uncapped bore or an open bore drain.

Any further areas on a particular lease that a State Land Officer has advised must be assessed under s.159 must also be visited.

If any of the areas of interest listed above are identified for the first time while traversing the lease land, they are also considered areas of interest.

For all areas of interest, record on a personal digital assistant (PDA) or on a copy of the field observation sheet that is provided in Appendix E, the location (GPS coordinate) and observations, and take photographs.

In addition, for:

- Indigenous cultural heritage values, follow departmental procedures
- significant natural environmental values, assess the indicators set out in section 5 (however, these sites do not contribute to the lease score)
- areas where there may be a land degradation issue identified by a database or remote sensing product, record the process taking place (e.g. whether it is a weed outbreak or thickening, etc.)
- uncapped bores or open bore drains, follow departmental procedures.

3.3 Lease land observations

While traversing the lease land, look out for; photograph; and record the location (using a GPS), extent and severity of any ‘unnatural’ soil erosion. (Note that some erosion features, such as scarps and jump ups can be part of the natural landscape evolutionary process.) Recording ‘unnatural’ soil erosion features is very important, as significant soil erosion factors into the determination of lease land condition.

In addition, also record the location (using a GPS), extent and/or condition, where appropriate, of the following:

- declared pests
- native fauna species
- thickening of regional ecosystems
- open bore drains or uncapped bores
- Indigenous or non-Indigenous cultural heritage values
- areas of significant natural environmental value
- any other significant observations related to the condition and the appropriate use of the lease land.

Recording this information is important, as these matters may be included in the Land Management Agreement for the lease.

4 Site assessment and rating

4.1 Process

The site assessment procedure involves evaluating the following seven attributes:

- pasture
- soil
- biodiversity
- declared pests
- salinity
- riparian vegetation
- natural water resources

For each attribute, there are one or more indicators that must be assessed. Appropriate indicators for these attributes depend on whether or not the site has recently been mechanically disturbed, or whether or not it is in a riparian area. Consequently, indicators for:

- sites in the land type strata are set out in section 5
- sites in a riparian area are set out in section 6
- sites in the recently mechanically disturbed stratum are set out in section 7.

At every assessment site, each of the indicators for the stratum will be given a rating. Once the field assessment has been completed, these ratings are used to derive ‘scores’. Attribute scores are calculated for the assessment site, each stratum and the lease. For the biodiversity attribute, a biodiversity score is calculated and then an ‘adjusted’ biodiversity score calculated – the adjusted score omits certain indicators at particular (developed) sites. The lease attribute scores for pasture, soil and the adjusted biodiversity score are the determinants of lease land condition. The process by which scores are calculated is set out in a diagram in Appendix C and described in section 8.

While the assessment methodology involves determining the condition of individual attributes across the lease land, these findings are for the purpose of:

- determining the overall condition; and
- identifying issues that may need to be addressed in the land management agreement.

Accordingly, where, for example, an assessment under the guidelines finds that soil across a lease land is ‘good’, other agencies or organisations may reach a different conclusion using other criteria or assessment methods. In short, what is determined under the guidelines is only for the purpose of the guidelines (see section 1).

4.2 Weights on indicators

The weighting approach used is based on the Kepner-Tregoe⁴ weighting and scoring methodology in which weights are initially set by subject matter experts. Subsequently, weights are trialled, calibrated and adjusted, as appropriate. The technical working group followed this process to determine indicator weights.

The higher the weight of the indicator, the greater is its influence in the calculation of the attribute rating. For example, an indicator with a weight of 4 has twice as much impact as an indicator with a weight of 2.

The weightings assigned to each indicator are based on a five-point scale. For example, with the soil attribute, the 'soil surface condition' indicator has the highest value of 5, while the 'ground cover' indicator is assigned a value of 4. An indicator that does not apply to, or have an influence on land condition at particular sites, receives a 0 (zero) weighting.

Indicator weightings are generally consistent across sites, with two exceptions. The weighting of the indicator 'ground cover' changes from 4 to 5 on sites that have a slope of more than 3 per cent; and the weighting on the indicator 'declared pest plants' is variable within the biodiversity and riparian vegetation attributes, as outlined in Appendix D.

See Table 3 for an indication of the level of influence for selected indicator weightings and Appendix D for all indicator weights.

Table 3. Sample indicator weights

Weighting	Level of influence
5	Very high
3	Moderate
1	Very low
0	N/A

4.3 How to use the indicators

Although an indicator may be applicable to more than one attribute, it is only listed in a section once. (Appendix D shows the indicators of each attribute.)

For sites in the recently mechanically disturbed stratum, assess only the indicators listed in section 7. For sites in riparian areas, assess only the indicators listed in section 6. For all other areas, assess the indicators listed in section 5.

The question (Q) shown before each table is a plain English description conveying the purpose of the indicator. Implementation notes, marked with a #, are provided for some indicators that may require additional instructions or interpretation. The table that follows each indicator sets out a list of descriptions with corresponding ratings.

4.4 Ratings

The indicators set out in sections 5, 6 and 7 must be given a rating on a scale of 0–4, 1–4, 2–3 or 0, 2–3, as listed in the table for that indicator. A 0 (zero) rating option is available for indicators that do not necessarily apply to all sites. If a site is assigned a 0 rating, the indicator does not contribute to any score.

If none of the ratings in the indicator assessment table exactly describes the site, choose the rating which comes closest to describing it.

4.5 Instructions for site assessments

The following process must be used at each assessment site:

1. Arrive at an initial site coordinate that was generated during the desktop assessment (the initial coordinate) (refer to Figure 1).
2. Observe the 100 metre x 100 metre area defined from the initial coordinate.
3. If the area is where **land types** are transitioning, move the assessment site 400 metres beyond the transition zone, unless the target land type is a narrow **alluvial land type** (see Table S-1). If the target stratum is an alluvial land type that is narrow, move the site so that it contains the alluvial land type.

⁴ Kepner-Tregoe Decision Making © methodology

4. If the area has been very recently burnt and the pasture has not yet responded, or exposed bedrock exists across >50 per cent of the site, move the assessment site 100 metres beyond the burnt or exposed area.
5. Relocate the site if there is any infrastructure (e.g. a fence, track or laneway) or earthworks that are on, or impacting on, the site that were not identified during the desktop assessment. In this case, move the site to a location close by that is similar to the initial site, but that has not been disturbed.
6. Determine if the site has been **recently mechanically disturbed**. If so, record on a PDA or a copy of the sheet provided in Appendix E, and assess and rate the indicators listed in section 7.
7. If a targeted riparian site falls on an area without riparian vegetation, the site is not assessed. However if a riparian area had been observed prior to this site, it may be necessary to back track to the nearest suitable riparian area and assess a site there to ensure the minimum of three riparian sites across the lease land.
8. If the site is a riparian site, assess and rate the indicators listed in section 6, using the most appropriate alluvial land type sheet for the site. The riparian site extends 100 metres along the drainage line and the width of the riparian vegetation to a maximum width of 100 metres.
9. Refer to the land type mapping of the lease land and confirm whether the site corresponds to the land type identified on the map. If the site is in fact a different land type, determine which land type the site is and record this on a PDA or a copy of the field observation sheet provided in Appendix E. If it is not the targeted land type, an additional site will be created in the targeted land type (in the same polygon, if possible). If the number of sites in a land type is less than that required in Table 2 (due to mixed polygons and parts of the polygon being distant from access), the minimum number of sites may be reduced.
10. Record whether the:
 - (a) site comprises remnant or non-remnant vegetation; and
 - (b) groundlayer comprises >25% exotic invasive pasture species.
11. If the remnant status of a site is inconsistent with current mapping, record the inconsistency on a PDA or a copy of the field observation sheet provided in Appendix E, and assess and rate the site. Review the site's remnant status during the post-field analysis in consultation with experts on regional ecosystem mapping.
12. In all instances, regardless of whether the site is or is not moved as a result of 4.5.3 to 11 above, RLLOs must record the on ground coordinate/location of the centre point of the site using the 'capture coordinate' button on the Ranger. If the site is not moved as a result of 4.5.3 to 11 above, the centre point is consistent with the initial coordinate (refer to 4.5.1).
13. Once the site is located, there are different requirements depending on the site, as follows:
 - (a) At sites where there is some variability and a medium to high spatial density of pasture species, two 50 metre transects are required, orientated in north-south and east-west directions; or
 - (b) At sites where there is significant variability and a low spatial density of pasture species, two 100 metre transects are required, orientated in north-south and east-west directions; or
 - (c) At sites that are homogenous, a minimum of one 50 metre or one 100 metre transect in a north-south direction may be appropriate; and
 - (d) At sites where ground cover is estimated to be less than 15 per cent or greater than 70 per cent, transects are optional (but preferable) - otherwise an estimate of total ground cover is to be recorded.

Transects can be assessed using either the line intercept (tape) or step point method.
14. For the step point method, walk along the transect and, at each one-metre pace, record on the PDA or the field observation sheet the uppermost ground-cover component that intercepts a point or mark on the centre of the toe of the boot (e.g. if there is leaf of a perennial species on a rock, record 'canopy of any perennial species'). In sites where the pasture is dense or tall, care must be taken to ensure that the first point in the ground layer vertically intercepted is recorded. Avoid unduly trampling or shifting the ground cover along the transect, as this may bias the result. The ground-cover components are:
 - (a) bare ground (including sand surfaces and cracks in cracking earths, unless the cracks contain grass, forb, or tree litter, rock, or manure)
 - (b) rock (any gravel, pebble, cobble, stone, boulder, shell, charcoal or pumice, with or without moss or lichen on the surface)
 - (c) canopy of any preferred, intermediate or non-preferred species
 - (d) **base** of any preferred, intermediate or non-preferred species
 - (e) other (soft litter, woody litter, perennial forb canopy, perennial forb base, annual species canopy, annual species **base**, cryptogam, shrub canopy, shrub, and declared pest plants).

Part 3

Site assessment indicators

5. Indicators for sites in the land type strata

The indicators for sites in the land type strata are only listed once. At each site, each indicator must be assessed. The indicators that contribute to each attribute are set out in Table 4 below.

Table 4. Attributes and indicators for sites in the land type strata

Attribute	Indicator of attribute	Relevant section
Pasture	Proportion of preferred species	5.1
	Density of preferred species	5.2
	Proportion of intermediate (and preferred) species	5.3
	Density of intermediate (and preferred) species	5.4
	Health of preferred and intermediate species	5.5
	Proportion of non-preferred species	5.6
	Density of non-preferred species	5.7
Soil	Soil surface condition	5.8
	Ground cover	5.9
	Salinity	5.10
Biodiversity	Proportion of native ground layer species	5.11
	Density of native ground layer species	5.12
	Large trees	5.13
	Shrub layer	5.14
	Woody debris and litter	5.15
	Recruitment of woody perennial species	5.16
	Non-native species – excluding declared pest plants	5.17
	Size of patch	5.18
	Declared pest plants	5.19
Declared pests	Declared pest plants	5.19
	Declared pest animals	5.20
Salinity	Salinity	5.10

5.1 Indicator 1—Proportion of preferred species

Q. What proportion of the ground layer are established preferred species?

Refer to the glossary for definitions of: site; annually dominated land type; annual species; established; preferred; TSDM; base; ground layer.

Table 5. Proportion of preferred species

Rating	Description
0	The site is located within: a) the ‘occasionally flooded alluvial plains’ land type; or b) the ‘hard gibber and ironstone country’ land type; or c) a regional ecosystem where thinning cannot occur and tree basal area is $>20 \text{ m}^2/\text{ha}$.
1	Established preferred species are $>80\%$ of TSDM or $>80\%$ of total ground layer bases
2	Established preferred species are 61–80% of TSDM or 61–80% of total ground layer bases
3	Established preferred species are 10–60% of TSDM or 10–60% of total ground layer bases
4	Established preferred species are $<10\%$ of TSDM or $<10\%$ of total ground layer bases

5.2 Indicator 2—Density of preferred species

Q. What is the closeness and spatial arrangement of established preferred species?

First, assess **tree basal area** to determine whether it is an **expected high, moderate or low density land type** (as per definitions; see also Tables S-2, S-3, S-4 and *Appendix F*) and then assess the density of preferred species.

Refer to the glossary for definitions of: site; annually dominated land type; annual species; expected high density land type; established; preferred; expected moderate density land type; expected low density land type; open; sparse.

Table 6. Density of preferred species

Rating	Description
0	The site is located within: <ul style="list-style-type: none"> a) the ‘occasionally flooded alluvial plains’ land type; or b) the ‘hard gibber and ironstone country’ land type; or c) a regional ecosystem where thinning cannot occur and tree basal area is >20 m²/ha.
1	The site is within an: <ul style="list-style-type: none"> a) expected high density land type, and established preferred species are closed and evenly distributed; or b) expected moderate density land type, and established preferred species are open and evenly distributed; or c) expected low density land type, and established preferred species are sparse and evenly distributed.
2	The site is within an: <ul style="list-style-type: none"> a) expected high density land type and established preferred species are: <ul style="list-style-type: none"> – open and evenly distributed; or – partly closed and unevenly distributed; or b) expected moderate density land type and established preferred species are: <ul style="list-style-type: none"> – sparse and evenly distributed; or – partly open and unevenly distributed; or c) expected low density land type and established preferred species are: <ul style="list-style-type: none"> – very sparse and evenly distributed; or – partly sparse and unevenly distributed.
3	The site is within an: <ul style="list-style-type: none"> a) expected high density land type and established preferred species are: <ul style="list-style-type: none"> – sparse and evenly distributed; or – partly open and unevenly distributed; or b) expected moderate density land type and established preferred species are: <ul style="list-style-type: none"> – very sparse and evenly distributed; or – partly sparse and unevenly distributed; or c) expected low density land type and established preferred species are: <ul style="list-style-type: none"> – isolated and evenly distributed; or – partly very sparse and unevenly distributed.
4	The site is within an: <ul style="list-style-type: none"> a) expected high density land type and established preferred species are: <ul style="list-style-type: none"> – very sparse and evenly distributed; or – partly sparse and unevenly distributed; or – absent; or b) expected moderate density land type and established preferred species are: <ul style="list-style-type: none"> – isolated and evenly distributed; or – partly very sparse and unevenly distributed; or – absent; or c) expected low density land type and established preferred species are: <ul style="list-style-type: none"> – absent; or – partly isolated and unevenly distributed.

5.3 Indicator 3—Proportion of intermediate (and preferred) species

Q. What proportion of the ground layer are established intermediate and established preferred species?

For ratings 1 to 4, assess established intermediate and preferred species together. Assess total standing dry matter (TSDM) contribution or by **ground layer bases** where clearly visible.

Refer to the glossary for definitions of: established; preferred; site; annually dominated land type; annual species; intermediate; preferred; TSDM; base; ground layer.

Table 7. Proportion of intermediate (and preferred) species

Rating	Description
0	The site is Rated 1 for Indicators 1 and 2; or the site is located within: a) an annually dominated land type; b) a regional ecosystem where thinning cannot occur and tree basal area is >20 m ² /ha.
1	Established intermediate and preferred species are >80% of TSDM or >80% of total ground layer bases
2	Established intermediate and preferred species are 61–80% of TSDM or 61–80% of total ground layer bases
3	Established intermediate and preferred species are 10–60% of TSDM or 10–60% of total ground layer bases
4	Established intermediate and preferred species are <10% of TSDM or <10% of total ground layer bases

5.4 Indicator 4—Density of intermediate (and preferred) species

Q. What is the closeness and spatial arrangement of established intermediate and preferred species?

First assess **tree basal area** to determine whether it is an **expected high, moderate or low density land type** (as per definitions; see also Tables S-2, S-3, S-4 and Appendix F). For ratings 1 to 4, assess the density of **established intermediate** and **established preferred** species together.

Refer to the glossary for definitions of: established; preferred; site; annually dominated land type; annual species; expected high density land type; intermediate; closed; expected moderate density land type; expected low density land type; sparse.

Table 8. Density of intermediate (and preferred) species

Rating	Description
0	The site is Rated 1 for Indicators 1 and 2; or the site is located within: a) an annually dominated land type; b) a regional ecosystem where thinning cannot occur and tree basal area is >20 m ² /ha.
1	The site is within an: a) expected high density land type and established intermediate and preferred species are closed and evenly distributed; or b) expected moderate density land type and established intermediate and preferred species are open and evenly distributed; or c) expected low density land type and established intermediate and preferred species are sparse and evenly distributed.
2	The site is within an: a) expected high density land type and established intermediate and preferred species are: – open and evenly distributed; or – partly closed and unevenly distributed; or b) expected moderate density land type and established intermediate and preferred species are: – sparse and evenly distributed; or – partly open and unevenly distributed; or c) expected low density land type and established intermediate and preferred species are: – very sparse and evenly distributed; or – partly sparse and unevenly distributed.
3	The site is within an: a) expected high density land type and established intermediate and preferred species are: – sparse and evenly distributed; or – partly open and unevenly distributed; or b) expected moderate density land type and established intermediate and preferred species are: – very sparse and evenly distributed; or – partly sparse and unevenly distributed; or c) expected low density land type and established intermediate and preferred species are: – isolated and evenly distributed; or – partly very sparse and unevenly distributed.
4	The site is within an: a) expected high density land type and established intermediate and preferred species are: – very sparse and evenly distributed; or – partly sparse and unevenly distributed; or – absent; or b) expected moderate density land type and established intermediate and preferred species are: – isolated and evenly distributed; or – partly very sparse and unevenly distributed; – absent; or c) expected low density land type and established intermediate and preferred species are: – absent; or – partly isolated and unevenly distributed.

5.5 Indicator 5—Health of preferred and intermediate species

Q. What proportion of the established preferred and/or intermediate species are alive?

Assess both preferred and intermediate species together.

Refer to the glossary for definitions of: site; annually dominated land type; annual species; established; preferred; intermediate; alive.

Table 9. Health of preferred and intermediate species

Rating	Description
0	Established preferred and intermediate species are <10% of the site; or the site is located within: a) an annually dominated land type; b) a regional ecosystem where thinning cannot occur and tree basal area is >20 m ² /ha.
1	>70% of established preferred and intermediate species are alive
2	31–70% of established preferred and intermediate species are alive
3	10–30% of established preferred and intermediate species are alive
4	<10% of established preferred and intermediate species are alive

5.6 Indicator 6—Proportion of non-preferred species

Q. What proportion of the ground layer is established non-preferred species?

Assess total standing dry matter (**TSDM**) contribution or by **ground layer bases** where clearly visible.

Refer to the glossary for definitions of: site; annually dominated land type; annual species; established; non-preferred; TSDM; bases; ground layer.

Table 10. Proportion of non-preferred species

Rating	Description
0	The site is located within a regional ecosystem where thinning cannot occur and tree basal area is >20 m ² /ha.
1	Established non-preferred species are <10% of TSDM or <10% of total ground layer bases
2	Established non-preferred species are 10–60% of TSDM or 10–60% of total ground layer bases
3	Established non-preferred species are 61–80% of TSDM or 61–80% of total ground layer bases
4	Established non-preferred species are >80% of TSDM or 80% of total ground layer bases

5.7 Indicator 7—Density of non-preferred species

Q. What is the closeness and spatial arrangement of non-preferred species?

First, assess the **tree basal area** to determine whether it is an **expected high, moderate** or **low density land type** (as per definitions; see also Tables S-2, S-3, S-4 and Appendix F). Then assess the density of **non-preferred** species.

Refer to the glossary for definitions of: site; expected high density land type; established; non-preferred; very sparse; sparse; expected moderate density land type; expected low density land type; expected high density land type.

Table 11. Density of non-preferred species

Rating	Description
0	The site is located within a regional ecosystem where thinning cannot occur and tree basal area is >20 m ² /ha.
1	The site is within an: <ul style="list-style-type: none"> a) expected high density land type and established non-preferred species are: <ul style="list-style-type: none"> – very sparse and evenly distributed; or – partly sparse and unevenly distributed; or – absent; or b) expected moderate density land type and established non-preferred species are: <ul style="list-style-type: none"> – isolated and evenly distributed; or – partly very sparse and unevenly distributed; – absent; or c) expected low density land type and established non-preferred species are: <ul style="list-style-type: none"> – absent; or – partly isolated and unevenly distributed.
2	The site is within an: <ul style="list-style-type: none"> a) expected high density land type and established non-preferred species are: <ul style="list-style-type: none"> – sparse and evenly distributed; or – partly open and unevenly distributed; or b) expected moderate density land type and established non-preferred species are: <ul style="list-style-type: none"> – very sparse and evenly distributed; or – partly sparse and unevenly distributed; or c) expected low density land type and established non-preferred species are: <ul style="list-style-type: none"> – isolated and evenly distributed; or – partly very sparse and unevenly distributed.
3	The site is within an: <ul style="list-style-type: none"> a) expected high density land type and established non-preferred species are: <ul style="list-style-type: none"> – open and evenly distributed; or – partly closed and unevenly distributed; or b) expected moderate density land type and established non-preferred species are: <ul style="list-style-type: none"> – sparse and evenly distributed; or – partly open and unevenly distributed; or c) expected low density land type and established non-preferred species are: <ul style="list-style-type: none"> – very sparse and evenly distributed; or – partly sparse and unevenly distributed.
4	The site is within an: <ul style="list-style-type: none"> a) expected high density land type and established non-preferred and species are closed and evenly distributed; or b) expected moderate density land type and established non-preferred species are open and evenly distributed; or c) expected low density land type and established non-preferred species are sparse and evenly distributed.

5.8 Indicator 8—Soil surface condition

Q. Are there signs of soil surface erosion or soil movement across the site?

Refer to the glossary for definitions of: site; rills; gully; terracettes.

Table 12. Soil surface condition

Rating	Description
1	There is very little evidence of soil erosion across the site.
2	Site has minor soil erosion or soil disturbance, evident by one or more of the following: <ul style="list-style-type: none"> – soil surface compaction, cementing or soil crusting – minor soil deposition – signs of increased run off or overland flow – pedestals <2 cm – terracettes <2 cm – occasional rills – gullies isolated and well vegetated, if present – livestock and other animal tracks affecting water movement – exposed subsoils, contiguous over 100–500 m² (<5%) of the site.
3	Site has moderate soil erosion, evident by one or more of the following: <ul style="list-style-type: none"> – pedestals 2–5 cm – terracettes 2–5 cm – some exposure of roots – some soil mounding around obstructions – some gravel and stone pavements (having a concrete look) - except on Gibber plains or areas of extremely high 'natural' ironstone cover – rills common, numerous small channels 5–15 cm wide and/or deep – gullies <15 % of site, linear, continuous, relatively bare of vegetation, distinct formation of gully heads, 1.5 –3.0 m deep – exposed subsoils, contiguous over 501–1000 m² (5–10%) of the site.
4	Site has severe soil erosion, evident by one or more of the following: <ul style="list-style-type: none"> – root exposure – terracettes >5 cm – pedestals >5 cm – prominent sand mounds blown against objects – prominent gravel and stone pavements (having a concrete look) - except on Gibber plains or areas of extremely high 'natural' ironstone cover – rills numerous, overland flow, corrugated ground surface – runoff concentrated into well developed channels 15–30 cm deep – gullies >15% of site, >3 m deep, branching away from drainage lines or multiple branches within drainage lines, devoid of vegetation – substantial deposits of soil down slope – vegetated areas isolated in mounds or depressions – exposed subsoils, contiguous over >1000 m² (>10%) of the site.

5.9 Indicator 9—Ground cover

Q. What is the average proportion of the total ground cover of the site?

Refer to the glossary for definitions of: ground cover (see also Appendix G).

Table 13. Ground cover

Rating	Description
1	Ground cover is >70% and uniform and even
2	Ground cover is 40–70% and uniform and even, or >70% and uneven
3	Ground cover is 15–39% and uniform and even, or 40–70% and uneven
4	Ground cover is <15% and uniform and even, or 15–39% and uneven

5.10 Indicator 10—Salinity

Q. Are there signs of increased salinity across the site?

See the glossary for a list of some plants that may indicate waterlogging/salinity (see also Table S-5).

Table 14. Salinity

Rating	Description
1	Plant species that may indicate waterlogging and/or salinity may be present; but there are no bare areas caused by salinity
2	Plant species that may indicate waterlogging and/or salinity are present but sparse; and bare areas caused by salinity comprise <5% of the site
3	Plant species that may indicate waterlogging and/or salinity are common; and bare areas caused by salinity comprise 5–10% of the site
4	Plant species that may indicate waterlogging and/or salinity dominate; and bare areas are greater than 10% of the site and are often badly eroded

5.11 Indicator 11—Proportion of native ground layer species

Q. What proportion of the ground layer are established native preferred and native intermediate species?

Assess total standing dry matter (**TSDM**) contribution or by **ground layer bases** where clearly visible.

Refer to the glossary for definitions of: site; established; native preferred; established; TSDM; bases; native intermediate species; ground layer; annually dominated land type.

Table 15. Proportion of native ground layer species

Rating	Description
0	The site is located within: a) the ‘occasionally flooded alluvial plains’ land type; b) the ‘hard gibber and ironstone country’ land type; c) a regional ecosystem where thinning cannot occur and tree basal area is >20 m ² /ha; or
1	Established native preferred and established native intermediate species are >80% of the TSDM or >80% of total ground layer bases
2	Established native preferred and established native intermediate species are >61–80% of the TSDM or 61–80% of total ground layer bases
3	Established native preferred and established native intermediate species are 10–60% of the TSDM or 10–60% of total ground layer bases
4	Established native preferred and established native intermediate species are <10% of the TSDM or <10% of total ground layer bases

5.12 Indicator 12—Density of native ground layer species

Q. What is the closeness and spatial arrangement of established native preferred and native intermediate species?

First, assess **tree basal area** to determine whether it is an **expected high, moderate or low density land type**, (as per definitions; see also Tables S-2, S-3, S-4 and Appendix F); then assess the density of native, preferred and intermediate species.

Refer to the glossary for definitions of: site; expected high density land type; established; native preferred species; intermediate; open; closed; expected low density land type; sparse; expected high density land type; expected moderate density land type; very sparse; sparse.

Table 16. Density of native ground layer species

Rating	Description
0	<p>The site is located within:</p> <ul style="list-style-type: none"> a) the ‘occasionally flooded alluvial plains’ land type; b) the ‘hard gibber and ironstone country’ land type; c) a regional ecosystem where thinning cannot occur and tree basal area is >20 m²/ha; or
1	<p>The site is within an:</p> <ul style="list-style-type: none"> a) expected high density land type and established native preferred and established native intermediate species are closed and evenly distributed; or b) expected moderate density land type and established native preferred and established native intermediate species are open and evenly distributed; or c) expected low density land type and established native preferred and established native intermediate species are sparse and evenly distributed.
2	<p>The site is within an:</p> <ul style="list-style-type: none"> a) expected high density land type and established native preferred and established native intermediate species are: <ul style="list-style-type: none"> – open and evenly distributed; or – partly closed and unevenly distributed; or b) expected moderate density land type and established native preferred and established native intermediate species are: <ul style="list-style-type: none"> – sparse and evenly distributed; or – partly open and unevenly distributed; or c) expected low density land type and established native preferred and established native intermediate species are: <ul style="list-style-type: none"> – very sparse and evenly distributed; or – partly sparse and unevenly distributed.
3	<p>The site is within an:</p> <ul style="list-style-type: none"> a) expected high density land type and established native preferred and established native intermediate species are: <ul style="list-style-type: none"> – sparse and evenly distributed; or – partly open and unevenly distributed; or b) expected moderate density land type and established native preferred and established native intermediate species are: <ul style="list-style-type: none"> – very sparse and evenly distributed; or – partly sparse and unevenly distributed; or c) expected low density land type and established native preferred and established native intermediate species are: <ul style="list-style-type: none"> – isolated and evenly distributed; or – partly very sparse and unevenly distributed.
4	<p>The site is within an:</p> <ul style="list-style-type: none"> a) expected high density land type and established native preferred and established native intermediate species are: <ul style="list-style-type: none"> – very sparse and evenly distributed; or – partly sparse and unevenly distributed; or – absent; or b) expected moderate density land type and established native preferred and established native intermediate species are: <ul style="list-style-type: none"> – isolated and evenly distributed; or – partly very sparse and unevenly distributed; or – absent; or c) expected low density land type and established native preferred and established native intermediate species are: <ul style="list-style-type: none"> – absent; or – partly isolated and unevenly distributed.

5.13 Indicator 13—Large trees

Q. What proportion of the trees are native, large and mature?

Refer to the glossary for definitions of: grassland regional ecosystem; large mature trees.

Table 17. Native large trees

Rating	Description
0	The site is within a grassland regional ecosystem and no native trees are present
1	>70% of trees are native, large mature trees, relative to the regional ecosystem
2	31–70% of trees are native, large mature trees, relative to the regional ecosystem
3	10–30% of trees are native, large mature trees, relative to the regional ecosystem
4	<10% of trees are native, large mature trees; or native trees are excessively dense relative to the regional ecosystem

5.14 Indicator 14—Shrub layer

Q. Are native shrubs within the expected range for the regional ecosystem?

Refer to the glossary for definitions of: site; grassland regional ecosystem; shrub.

Table 18. Native shrub layer

Rating	Description
0	The site is within a grassland regional ecosystem and no native shrubs are present
1	Native shrub density/cover is within the expected range, relative to the regional ecosystem
2	Native shrub density/cover is approaching the expected range, relative to the regional ecosystem
3	Native shrub density/cover is not within the expected range, relative to the regional ecosystem, but native shrubs are not excessively dense or sparse
4	Native shrub density/cover is not within the expected range, relative to the regional ecosystem, as native shrubs are either excessively dense or absent

5.15 Indicator 15—Woody debris and litter

Q. What is the amount of woody debris and litter across the site, as expected for the regional ecosystem?

Refer to the glossary for definitions of: site; grassland regional ecosystem; logs.

Table 19. Woody debris and litter

Rating	Description
0	The site is within a grassland regional ecosystem and no trees are present
1	Frequent (but not excessive) presence of logs, woody debris and leaf litter, relative to the regional ecosystem
2	Moderate presence of logs, woody debris and leaf litter, relative to the regional ecosystem
3	Occasional presence of logs, woody debris and leaf litter, relative to the regional ecosystem
4	Absence or excessive presence of logs, woody debris and leaf litter, relative to the regional ecosystem

5.16 Indicator 16—Recruitment of woody perennial species

Q. What proportion of the native woody species are regenerating across the site?

Do not include non-native species including declared pest plants.

Refer to the glossary for definitions of: site; grassland regional ecosystem; declared; successfully regenerating.

Table 20. Recruitment of native woody species

Rating	Description
0	The site is within a grassland regional ecosystem and no native trees are present
1	Strong evidence (>75%) of native woody species successfully regenerating across the site
2	Some evidence (20–75%) of native woody species successfully regenerating across the site
3	Little evidence (<20%) of native woody species successfully regenerating across the site
4	No evidence of native woody species successfully regenerating across the site

5.17 Indicator 17—Non-native species – excluding declared pest plants

Q. What proportion of the ground-layer are non-native species, excluding declared pest plants?

Do not include declared pest plants.

Refer to the glossary for definitions of: site; grassland regional ecosystem.

Table 21. Non-native species – excluding declared pest plants

Rating	Description
1	Within the site non-native species (excluding declared pest plants) comprise less than 5% of ground layer
2	Within the site non-native species (excluding declared pest plants) comprise 5-25% of ground layer
3	Within the site non-native species (excluding declared pest plants) comprise 26-50% of ground layer
4	Within the site non-native species (excluding declared pest plants) comprise more than 50% of ground layer

5.18 Indicator 18—Size of patch

Q. Is the site located in remnant vegetation and what is the size of the patch of remnant vegetation?

Use the Queensland Herbarium’s regional ecosystem or remnant mapping.

Refer to the glossary for definitions of: site; grassland regional ecosystem; ‘subregion that has greater than 65% remnant vegetation’; remnant; regional ecosystem.

Table 22. Size of patch

Rating	Description
0	The site is within a subregion that has greater than 65% remnant vegetation and the site has remnant vegetation
1	The site is located within a patch of remnant vegetation >100 hectares
2	The site is located within a patch of remnant vegetation 31–100 hectares
3	The site is located within a patch of remnant vegetation 10–30 hectares
4	The site is located within a patch of remnant vegetation <10 hectares or is not remnant

5.19 Indicator 19—Declared pest plants

Q. How many declared pest plants are there on the site?

More than one ‘type’ of pest plant may be present, and in different densities (e.g. a declared grass and a declared vine). If so, rate both types, giving the site the higher of the two ratings. (For example, if the site has 1–10 per cent of a declared grass species and four stems of a declared succulent species, the rating for the site is 3. If there are two species that are the same type of pest plant, add the total number of stems. So, if the site has two stems of a declared succulent species and two stems of another declared succulent species, a rating of 3 would be assigned.)

Refer to the glossary for definitions of: site; declared.

Table 23. Declared pest plants

Rating	Description
1	Within the site: a) declared pest plants comprise a canopy cover of 0%; and b) there are no declared succulent species present.
2	Within the site either: a) declared pest plants comprise a canopy cover of <10%; or b) there are no more than 3 stems of a declared succulent species.
3	Within the site either: a) declared pest plants comprise a canopy cover of 10-30%; or b) there are either: (i) 4 to 10 stems of prickly pear; or (ii) 4 to 20 stems of mother of millions; or (iii) 4 to 6 stems of other declared succulent species.
4	Within the site either: a) declared pest plants comprise a canopy cover of >30%; or b) there are more than: (i) 10 stems of prickly pear; or (ii) 20 stems of mother of millions; or (iii) 6 stems of other declared succulents.

5.20 Indicator 20—Declared pest animals

Q. Has a declared pest animal, or signs of a declared pest animal, been observed on or within sight of the site?

Refer to the glossary for definitions of: declared.

Table 24. Declared pest animals

Rating	Description
2	There is little evidence of declared pest animals observed
3	There is significant evidence of declared pest animals and possibly some declared pest animals observed

6. Indicators for sites in riparian areas

The indicators for sites in riparian areas are listed once only. At each site, each indicator must be assessed. The indicators that contribute to each attribute are set out in Table 25.

Table 25. Attributes and indicators for sites in riparian areas

Attribute	Indicator of attribute	Relevant section
Riparian vegetation	Proportion of native ground layer species	6.1
	Density of native ground layer species	6.2
	Large trees	6.3
	Shrub layer	6.4
	Woody debris and litter	6.5
	Recruitment of woody perennial species	6.6
	Non-native species – excluding declared pest plants	6.7
	Size of patch	6.8
	Declared pest plants	6.9
	Declared pest animals	6.10
	Riparian area disturbance	6.11
Biodiversity	Proportion of native ground layer species	6.1
	Density of native ground layer species	6.2
	Large trees	6.3
	Shrub layer	6.4
	Woody debris and litter	6.5
	Recruitment of woody perennial species	6.6
	Non-native species – excluding declared pest plants	6.7
	Size of patch	6.8
	Declared pest plants	6.9
	Declared pest animals	6.10
	Riparian area disturbance	6.11
Natural water resources	Ground cover	6.12
	Salinity	6.13
	Bank instability	6.14
Soil	Ground cover	6.12
	Bank instability	6.14
Declared pests	Declared pest plants	6.9
	Declared pest animals	6.10

6.1 Indicator 21—Proportion of native ground layer species

Q. What proportion of the ground layer are established native preferred and native intermediate species?

Assess total standing dry matter (**TSDM**) contribution or by **ground layer bases** where clearly visible.

Refer to the glossary for definitions of: site; established; native preferred; TSDM; native intermediate; bases; ground layer; annually dominated land type.

Table 26. Proportion of native ground layer species

Rating	Description
0	The site is located within: a) the 'occasionally flooded alluvial plains' land type; b) the 'hard gibber and ironstone country' land type; c) a regional ecosystem where thinning cannot occur and tree basal area is >20 m ² /ha; or
1	Established native preferred and established native intermediate species are >80% of the TSDM or >80% of total ground layer bases
2	Established native preferred and established native intermediate species are >61–80% of the TSDM or 61–80% of total ground layer bases
3	Established native preferred and established native intermediate species are 10–60% of the TSDM or 10–60% of total ground layer bases
4	Established native preferred and established native intermediate species are <10% of the TSDM or <10% of total ground layer bases

6.2 Indicator 22—Density of native ground layer species

Q. What is the closeness and spatial arrangement of established native intermediate and native preferred species?

First, assess **tree basal area** to determine whether it is an **expected high, moderate or low density land type** (as per definitions; see also Tables S-2, S-3, S-4 and *Appendix F*); then assess the density of native preferred and intermediate species.

Refer to the glossary for definitions of: site; expected high density land type; established; native preferred; established; native intermediate; closed; expected moderate density land type; sparse; open; expected moderate density land type; expected low density land type; very sparse; intermediate.

Table 27. Density of native ground layer species

Rating	Description
0	The site is located within: a) the ‘occasionally flooded alluvial plains’ land type; b) the ‘hard gibber and ironstone country’ land type; c) a regional ecosystem where thinning cannot occur and tree basal area is >20 m ² /ha; or
1	The site is within an: a) expected high density land type and established native preferred and established native intermediate species are closed and evenly distributed; or b) expected moderate density land type and established native preferred and established native intermediate species are open and evenly distributed; or c) expected low density land type and established native preferred and established native intermediate species are sparse and evenly distributed.
2	The site is within an: a) expected high density land type and established native preferred and established native intermediate species are: – open and evenly distributed; or – partly closed and unevenly distributed; or b) expected moderate density land type and established native preferred and established native intermediate species are: – sparse and evenly distributed; or – partly open and unevenly distributed; or c) expected low density land type and established native preferred and established native intermediate species are: – very sparse and evenly distributed; or – partly sparse and unevenly distributed.
3	The site is within an: a) expected high density land type and established native preferred and established native intermediate species are: – sparse and evenly distributed; or – partly open and unevenly distributed; or b) expected moderate density land type and established native preferred and established native intermediate species are: – very sparse and evenly distributed; or – partly sparse and unevenly distributed; or c) expected low density land type and established native preferred and established native intermediate species are: – isolated and evenly distributed; or – partly very sparse and unevenly distributed.
4	The site is within an: a) expected high density land type and established native preferred and established native intermediate species are: – very sparse and evenly distributed; or – partly sparse and unevenly distributed; or – absent; or b) expected moderate density land type and established native preferred and established native intermediate species are: – isolated and evenly distributed; or – partly very sparse and unevenly distributed; or – absent; or c) expected low density land type and established native preferred and established native intermediate species are: – absent; or – partly isolated and unevenly distributed.

6.3 Indicator 23—Large trees

Q. What proportion of the trees are native, large and mature?

Refer to the glossary for definitions of: site; grassland regional ecosystem; large mature trees.

Table 28. Native large trees

Rating	Description
0	The site is within a grassland regional ecosystem and no native trees are present
1	>70% of trees are large native mature trees, relative to the regional ecosystem
2	31–70% of trees are large native mature trees, relative to the regional ecosystem
3	10–30% of trees are large native mature trees, relative to the regional ecosystem
4	<10% of trees are large native mature trees; or native trees are excessively dense relative to the regional ecosystem

6.4 Indicator 24—Shrub layer

Q. Are native shrubs within the expected range for the regional ecosystem?

Refer to the glossary for definitions of: site; grassland regional ecosystem; shrub.

Table 29. Native shrub layer

Rating	Description
0	The site is within a grassland regional ecosystem and no native shrubs are present
1	Native shrub density/cover is within the expected range, relative to the regional ecosystem
2	Native shrub density/cover is approaching the expected range, relative to the regional ecosystem
3	Native shrub density/cover is not within the expected range, relative to the regional ecosystem, but native shrubs are not excessively dense or sparse
4	Native shrub density/cover is not within the expected range, relative to the regional ecosystem, as native shrubs are either excessively dense or absent

6.5 Indicator 25—Woody debris and litter

Q. Is the amount of woody debris and litter across the site as expected for the regional ecosystem?

Refer to the glossary for definitions of: grassland regional ecosystem; logs.

Table 30. Woody debris and litter

Rating	Description
0	The site is within a grassland regional ecosystem and no native trees are present
1	Frequent (but not excessive) presence of logs, woody debris and leaf litter, relative to the regional ecosystem
2	Moderate presence of logs, woody debris and leaf litter, relative to the regional ecosystem
3	Occasional presence of logs, woody debris and leaf litter, relative to the regional ecosystem
4	Absence or excessive presence of logs, woody debris and leaf litter, relative to the regional ecosystem

6.6 Indicator 26—Recruitment of woody perennial species

Q. What proportion of the native woody species are regenerating across the site?

Do not include non-native species including declared pest plants.

Refer to the glossary for definitions of: site; grassland regional ecosystem; declared; successfully regenerating.

Table 31. Recruitment of native woody species

Rating	Description
0	The site is within a grassland regional ecosystem and no native trees are present
1	Strong evidence (>75%) of native woody species successfully regenerating across the site
2	Some evidence (20–75%) of native woody species successfully regenerating across the site
3	Little evidence (<20%) of native woody species successfully regenerating across the site
4	No evidence of native woody species successfully regenerating across the site

6.7 Indicator 27—Non-native species – excluding declared pest plants

Q. What proportion of the ground-layer are non-native species, excluding declared pest plants?

Do not include declared pest plants. (See Figure 3—Canopy health).

Refer to the glossary for definitions of: site; grassland regional ecosystem; canopy health category.

Table 32. Non-native species – excluding declared pest plants

Rating	Description
1	Within the site non-native species (excluding declared pest plants) comprise less than 5% of ground layer
2	Within the site non-native species (excluding declared pest plants) comprise 5–25% of ground layer
3	Within the site non-native species (excluding declared pest plants) comprise 26–50% of ground layer
4	Within the site non-native species (excluding declared pest plants) comprise more than 50% of ground layer

6.8 Indicator 28—Size of patch

Q. Is the site located in remnant vegetation and what is the size of the patch of remnant vegetation?

Use the Queensland Herbarium’s regional ecosystem or remnant mapping.

Refer to the glossary for definitions of: site; grassland regional ecosystem; subregion that has greater than 65% remnant vegetation’.

Table 33. Size of patch

Rating	Description
0	The site is within a subregion that has greater than 65% remnant vegetation and the site has remnant vegetation
1	The site is located within a patch of a remnant regional ecosystem >100 hectares
2	The site is located within a patch of a remnant regional ecosystem 31–100 hectares
3	The site is located within a patch of a remnant regional ecosystem 10–30 hectares
4	The site is located within a patch of a remnant regional ecosystem <10 hectares

6.9 Indicator 29—Declared pest plants

Q. How many declared pest plants are there on the site?

More than one ‘type’ of pest plant may be present, and in different densities (e.g. a declared grass and a declared vine). If so, rate both types, giving the site the higher of the two ratings. (For example, if the site has 1–10 per cent of a declared grass species and four stems of a declared succulent species, the rating for the site is 3. If there are two species that are the same type of pest plant, add the total number of stems. So, if the site has two stems of a declared succulent species and two stems of another declared succulent species, a rating of 3 would be assigned.)

Refer to the glossary for definitions of: site; declared.

Table 34. Declared pest plants

Rating	Description
1	Within the site: a) declared pest plants comprise a canopy cover of 0%; and b) there are no declared succulent species present.
2	Within the site either: a) declared pest plants comprise a canopy cover of <10%; or b) there are no more than 3 stems of a declared succulent species.
3	Within the site either: a) declared pest plants comprise a canopy cover of 10-30%; or b) there are either: (i) 4 to 10 stems of prickly pear; or (ii) 4 to 20 stems of mother of millions; or (iii) 4 to 6 stems of other declared succulent species.
4	Within the site either: a) declared pest plants comprise a canopy cover of >30%; or b) there are more than: (i) 10 stems of prickly pear; or (ii) 20 stems of mother of millions; or (iii) 6 stems of other declared succulents.

6.10 Indicator 30—Declared pest animals

Q. Has a declared pest animal, or signs of a declared pest animal, been observed on or within sight of the site?

Refer to the glossary for definitions of: declared.

Table 35. Declared pest animals

Rating	Description
2	There is little evidence of declared pest animals observed
3	There is significant evidence of declared pest animals and possibly some declared pest animals observed

6.11 Indicator 31—Riparian area disturbance

Q. Are livestock or vehicles generally excluded from the riparian area?

Assess only the drainage line and riparian vegetation (or area where riparian vegetation would naturally occur if the vegetation is disturbed, cleared or partially cleared).

Refer to the glossary for definitions of: watering points; severe soil erosion.

Table 36. Riparian area disturbance

Rating	Description
1	Little evidence of disturbance, or the riparian area is fenced, or watering points are located away from the watercourse
2	Evidence of permanent livestock tracks and pads, or vehicular access in the riparian area
3	Evidence of livestock camps in riparian area or area heavily disturbed by: a) livestock tracks or pads; or b) vehicular access.
4	Livestock tracks or pads; or vehicular access causing severe soil erosion in the riparian area

6.12 Indicator 32—Ground cover

Q. What is the average proportion of the total ground cover of the site?

Refer to the glossary for definitions of: ground cover (see also Appendix G).

Table 37. Ground cover

Rating	Description
1	Ground cover is >70% and uniform and even
2	Ground cover is 40–70% and uniform and even, or >70% and uneven
3	Ground cover is 15–39% and uniform and even, or 40–70% and uneven
4	Ground cover is <15% and uniform and even, or 15–39% and uneven

6.13 Indicator 33—Salinity

Q. Are there signs of increased salinity across the site?

See the Glossary for a list of some plants that may indicate waterlogging/salinity (see also Table S–5).

Table 38. Salinity

Rating	Description
1	Plant species that may indicate waterlogging and/or salinity may be present; but there are no bare areas caused by salinity
2	Plant species that may indicate waterlogging and/or salinity are present but sparse; and bare areas caused by salinity comprise 1-5% of the site
3	Plant species that may indicate waterlogging and/or salinity are common; and bare areas caused by salinity comprise 5-10% of the site
4	Plant species that may indicate waterlogging and/or salinity dominate; and bare areas are greater than 10% of the site and are often badly eroded

6.14 Indicator 34—Bank instability

Q. What is the relative stability of the stream banks within the site or within sight?

Assess only the drainage line and riparian vegetation (or area where riparian vegetation would naturally occur if the vegetation is disturbed, cleared or partially cleared).

Table 39. Bank instability

Rating	Description
1	Banks are stable; evidence of erosion or bank failure absent or minimal; little potential for future problems; <5% of bank sighted affected
2	Banks are moderately stable; infrequent, small areas of erosion mostly healed over; 5–30% of bank sighted has areas of erosion
3	Banks are moderately unstable; 31–60% of bank sighted has areas of erosion; high erosion potential during floods
4	Banks are unstable; many eroded areas; ‘raw’ areas frequent along straight sections and bends; obvious bank sloughing; 61–100% of bank sighted has erosion scars

7. Indicators for sites in the recently mechanically disturbed stratum

The indicators for sites in the **recently mechanically disturbed stratum** are listed once only. At each site, each indicator must be assessed. The indicators that contribute to each attribute are set out in Table 40.

Table 40. Attributes and indicators for sites in the recently mechanically disturbed stratum

Attribute	Indicator of attribute	Relevant section
Soil	Potential soil erosion	7.1
Declared pests	Declared pest plants	7.2
	Declared pest animals	7.3

7.1 Indicator 35—Potential soil erosion

Q. What rating best describes the combination of erosion control, ground cover and evidence of erosion?

Refer to the glossary for definitions of: site; ground cover.

Table 41. Potential soil erosion

Rating	Description
1	The site has all of the following: <ul style="list-style-type: none"> – appropriate erosion control measures are present; and – ground cover is >30%; and – no evidence of erosion.
2	The site has two of the following: <ul style="list-style-type: none"> – appropriate erosion control measures are present; – ground cover is >30%; or – no evidence of erosion.
3	The site has one or more of the following: <ul style="list-style-type: none"> – appropriate erosion control measures are present; – ground cover is >30%; or – no evidence of erosion.
4	The site has: <ul style="list-style-type: none"> – no appropriate erosion control measures; and – ground cover <30%; and – evidence of severe erosion.

7.2 Indicator 36—Declared pest plants

Q. How many declared pest plants are there on the site?

More than one ‘type’ of pest plant may be present, and in different densities (e.g. if the site has <10% of a grass species and 4 stems of a succulent species, the rating for the site is 3). If so, rate both types, and assign the higher of the two ratings. (For example, if the **site** has 1–10 per cent of a grass species and four stems of a succulent species, the rating for the site is 4. Similarly, if there are two species that are the same type of pest plant, add the total number of stems. So, if the site has two stems of a **declared** succulent species and two stems of another **declared** succulent species, a rating of 3 would be assigned.)

Refer to the glossary for definitions of: site; declared

Table 42. Declared pest plants

Rating	Description
1	Within the site: a) declared pest plants comprise 0% of canopy cover; and b) there are no declared succulent species present.
2	Within the site either: a) declared pest plants comprise <10% of canopy cover; or b) there are no more than 3 stems of a declared succulent species.
3	Within the site either: a) declared pest plants comprise 10–30% of canopy cover; or b) there are either: (i) 4 to 10 stems of prickly pear; or (ii) 4 to 20 stems of mother of millions; or (iii) 4 to 6 stems of other declared succulent species.
4	Within the site either: a) declared pest plants comprise >30% of canopy cover; or b) there are more than: (i) 10 stems of prickly pear; or (ii) 20 stems of mother of millions; or (iii) 6 stems of other declared succulents.

7.3 Indicator 37—Declared pest animals

Q. Has a declared pest animal, or signs of a declared pest animal, been observed on or within sight of the site?

Refer to the glossary for definitions of: declared.

Table 43. Declared pest animals

Rating	Description
2	There is little evidence of declared pest animals observed
3	There is significant evidence of declared pest animals and possibly some declared pest animals observed

Part 4

Determining condition

8. Determination process

Once all the indicators at all of the sites have been assessed, the attribute scores by site, stratum and lease must be determined. For biodiversity, an 'adjusted' biodiversity score must also be calculated, which omits certain indicators at developed sites. Each of the attributes: pasture, soil and 'adjusted biodiversity' must be good for the lease to be in good condition. The lease scores of these three attributes are key in the decision making process.

All attribute scores (including biodiversity, salinity, natural water resources, riparian vegetation and declared pests) will be reported on and will inform the land management agreement.

The calibrated threshold for each attribute is 70.

8.1 Calculate an attribute score for all sites (for all attributes except 'adjusted biodiversity')

1. Refer to the field assessment results, particularly the ratings obtained for each indicator at each site.
2. Refer to tables S-6, S-7 and S-8 in Appendix D, for the attributes, indicators and indicator weightings for each stratum.
3. For each indicator of the attribute, multiply the indicator weight by a factor that converts the rating of the indicator. If the rating allocated to the indicator in the field assessment was:
 - 1, multiply the weighting of the indicator by 4
 - 2, multiply the weighting of the indicator by 2.8
 - 3, multiply the weighting of the indicator by 1.6
 - 4, multiply the weighting by 0.4.
4. Add the indicator weighted scores.
5. Add the indicator weights for the attribute and multiply by 4.
6. Divide the results of step 4 by the results of step 5, then multiply by 100 to get an attribute score.

8.2 Calculate an 'adjusted biodiversity' attribute score for a site with non-remnant vegetation or >25% exotic invasive species in its ground layer

1. Refer to the Regional Ecosystem mapping and field records about the remnant status of vegetation at the site and the percentage of exotic invasive species in the ground layer.
2. If the site is comprised of non-remnant vegetation, give a rating of zero for indicators 13-18 and 23-28. If the ground layer of the site is comprised of >25% invasive exotic species, give a rating of zero for indicators 11, 12, 17, 21, 22 and 27. For all other indicators, use the ratings obtained during the field assessment.
3. Refer to tables S-6 and S-7 in Appendix D, for the indicators and indicator weightings of the adjusted biodiversity attribute.
4. For each indicator of the adjusted biodiversity attribute, other than those indicators which received a zero in step 2, multiply the indicator weight by a factor that converts the rating of the indicator. If the rating allocated to the indicator in the field assessment was:
 - 1, multiply the weighting of the indicator by 4
 - 2, multiply the weighting of the indicator by 2.8
 - 3, multiply the weighting of the indicator by 1.6
 - 4, multiply the weighting by 0.4.
5. Add the indicator weighted scores.
6. Add the indicator weights for the attribute and multiply by 4.
7. Divide the results of step 5 by the results of step 6, then multiply by 100 to get an adjusted biodiversity attribute score.

8.3 Calculate an attribute score for a stratum

1. For each attribute (pasture, soil, biodiversity, 'adjusted biodiversity', salinity, natural water resources, riparian vegetation and declared pests), add the attribute scores for each assessment site in the stratum.
2. Divide the total by the number of assessment sites in the stratum.

8.4 Calculate an attribute score for the lease

1. Subtract the areas of any inaccessible or too small stratum from the total area of the lease to get an assessed area.
2. For each stratum, divide the area of the land type by the assessed area.
3. Add the results of step 2 for each stratum to calculate the attribute score for the lease.

8.5 Determination of condition

The following sets out the procedure for determining whether the lease land is in good condition:

1. If the three attributes (pasture, soil and 'adjusted' biodiversity) score 70 or more, and significant soil erosion does not occur on the lease (see point 3 below for definition of significant soil erosion), the lease land is determined to be in 'good condition'.
2. If one or more of the three attributes (pasture, soil or 'adjusted' biodiversity) score less than 70, the lease land is determined to be not in 'good condition'.
3. If there is significant soil erosion across the land, the lease is determined to be not in good condition.
Significant soil erosion is when:
 - a) 5 per cent or more of the lease has sheet, rill or gully erosion, determined by one or more of the following: the Ground Cover Index or other remote sensing (e.g. SPOT imagery); other modelling products (e.g. AussieGRASS); past departmental reports for the lease (e.g. land evaluation or most appropriate use reports); or scientific reports that specifically discuss the lease land; AND
 - b) Widespread sheet, rill or gully erosion was observed during the field assessment that confirms the remote sensing, modelling or reports in (a) above. The observations must be supported by evidence including photos, GPS coordinates, or erosion mapping (collected during the field assessment).

Part 5

Supplementary tables

Table S–1. Alluvial land types

GLM region	Land type
Border Rivers	Coolibah Floodplains
Burdekin Dry Tropics	Clayey alluvials
	Loamy alluvials
Channel Country	Frequently flooded alluvial plains
	Frontage / alluvial country
	Occasionally flooded open plains
	Poorly drained swamps & depressions
Coastal Burnett	Blue gum flats
Darling Downs	Black soil creek flats
Desert Uplands	Channels and swamps associated with major streams
	Coolibah flats
	Frontage
	Lakebeds
Fitzroy	Alluvial brigalow
	Blue gum / river red gum flats
	Box flats
	Coastal flats with mixed eucalypts on grey clays
	Coolibah floodplains
Inland Burnett	Blue Gums on Cracking Clays
Mackay Whitsunday	Alluvial flats and plains
Maranoa Balonne	Coolibah flood plains
	Poplar box on alluvial plains
Mitchell Grass Downs	Flooded Mitchell grasslands
	Floodplains
	Open alluvial plains
	Wooded alluvial plains
Moreton	Blue gum on alluvial plains
	Gum-topped box and blue gum on mixed alluvium
Mulga	Open alluvial plains
	Wooded alluvial plains
Northern gulf	Coolibah country
	Frontage
	Old alluvials
Southern gulf	Frontage
Wet Tropics	Alluvial

Table S–2. Expected high pasture density land types

Region	Land type
Border Rivers	Belah and brigalow plains on texture contrast soils
	Brigalow belah +/- melonholes
	Coolibah floodplains
	Cypress pine and carbeen forest on undulating sandy plains
	Granite plains and rises with mixed grassy woodlands
	Poplar Box flats
	Traprock plains with box grassy woodlands
Burdekin Dry Tropics	Black basalt
	Blackwood scrubs on structure clays
	Box country
	Brigalow/gidgee scrubs
	Brown basalt
	Clayey alluvials
	Downs
	Goldfields country – black soils
	Goldfields country – red soils
	Loamy alluvials
	Narrow-leaved ironbark on deeper soils
	Narrow-leaved ironbark on shallow soils
	Ranges
	Red basalt
Coastal Burnett	Blue gum flats
	Blue gum, ironbark and bloodwood slopes and hollows
	Ironbarks and bloodwoods on non-cracking clays
	Ironbarks and blue gums on basalt ridges
Darling Downs	Black soil creek flats
	Blue gum and narrow-leaved ironbark on red soils
	Mountain coolibah open woodland
	Poplar box flats
Desert uplands	Box country
	Coolibah flats
	Downs
	Frontage
	Ironbark country
Fitzroy	Alluvial brigalow
	Blue gum / river red gum flats
	Box flats
	Coastal flats with mixed eucalypts on grey clays
	Coolibah floodplains
	Gum-topped box flats
	Mountain coolibah woodlands
	Narrow-leaved ironbark woodlands
	Open downs
	Poplar box / brigalow / bauhinia
	Poplar box with ironbark
	Silver-leaved ironbark on duplex

Region	Land type
Inland Burnett	Blue gum on cracking clays
	Blue gum on granite
	Blue gum on loams and duplexes
	Box on clay
	Gum-topped box
	Ironbarks and bloodwoods on non-cracking clays
	Ironbarks and spotted gums on duplexes and loams
	Ironbarks on basalt upper slopes and benches
	Mixed open forests on duplex and loam
	Silver-leaved ironbark on clay
Mackay Whitsunday	Alluvial flats and plains
	Coastal eucalypt forests and woodlands
	Coastal rainforests
	Coastal tea tree plains
	Coastal wetlands
	Eucalypt hills and ranges
	Marine plains and tidal flats
	Poplar gum woodlands
	Wet highland rainforests
Maranoa Balonne	Coolibah flood plains
	Mitchell grasslands
	Poplar box on alluvial plains
Mitchell grass downs	Boree wooded downs
	Flooded Mitchell grasslands
	Open alluvial plains
	Open downs
	Wooded alluvial plains
	Wooded downs
Moreton	Blue gum on alluvial plains
	Gum-topped box and blue gum on mixed alluvium
	Ironbarks and bloodwoods on non-cracking clays
	Ironbarks and blue gum on clays
	Mixed open forests on duplex and loam
	Tall open forests on basalts
	Tall open forests on steep hills and mountains
Mulga	Open downs
	Wooded alluvial plains
	Wooded downs
Northern gulf	Black soils on basalts and granite
	Coolibah country
	Frontage
	Georgetown granites
	Marine Plains
	Old alluvials
	Red basalt
	Red earths
	Red duplex
	Sandy forest
	Yellow earths

Region	Land type
Southern gulf	Basalt
	Bluegrass browntop plains
	Coastal country
	Frontage
	Gidgee country
	Hughenden rough country
	Ironbark
	Marine plains
	Mitchell grass
	Rough spinifex hills
	Sandy forest country
	Silverleaf box with perennial species
Wet Tropics	Alluvial
	Black soils on basalts and granite
	Range soil
	Red basalt
	Red soils
	Sandy red earths
	Yellow earths

Table S–3. Expected moderate pasture density land types

Region	Land type
Border Rivers	Bulloak country
	Granite hills with New England blackbutt and stringybark
	Poplar box on red soils
	Traprock hills with narrow-leaved ironbark and tumbledown gum
Burdekin Dry Tropics	Blackwood scrubs on massive soils
	Box and napunyah
	Lancewood / bendee / rosewood
	Silver-leaved ironbark
	Softwood scrub
	Yellowjack with other eucalypts
Channel country	Frontage / alluvial country
	Gidgee woodlands
	Open downs
	Sandplains
Coastal Burnett	Bloodwood and stringybark (coastal plains)
	Gum-topped box
	Ironbark, stringybark and supplejack on ridges
	Ironbarks and spotted gums on duplexes and loams
	Mixed eucalypts on coastal plains
	Tea tree flats
Darling Downs	Brigalow uplands
	Mountain coolibah and narrow-leaved ironbark open woodland
	Narrow-leaved ironbark on duplex soils
	Spotted gum and narrow-leaved ironbark on hills and ridges
Desert uplands	Channels and swamps associated with major streams
	Frontal dunes
	Hard ironbark country
	Scrubs on deep clays
	Scrubs on shallow clays
	Yellowjacket country + / – wattles
Fitzroy	Brigalow with blackbutt (Dawson gum)
	Brigalow with melonholes
	Brigalow softwood scrub
	Bulloak country
	Coastal sand dunes
	Coastal tea tree plains
	Cypress pine country
	Eucalypts and bloodwood on clay
	Eucalypts and bloodwood on loamy red tableland
	Eucalypts and bloodwood on sandy tableland
	Marine plains
	Narrow-leaved ironbark on mountain and ranges
	Poplar box with shrubby understorey
	Serpentine ironbark
	Spotted gum ridges
Yellowjack country	

Region	Land type
Inland Burnett	Bastard Scrub
	Box on erosive soils
	Brigalow and brigalow belah
	Brigalow with melonholes
	Narrow-leaved ironbark and wattles
	Narrow-leaved ironbark on granite
	Silver-leaved ironbark on granite
	Spotted gum ridges
	Tall open forest on snuffy soils
Maranoa Balonne	Bloodwood-ironbark woodland on steep rocky hills
	Brigalow belah scrub
	Brigalow with melonholes
	Cypress pine on duplex soils
	Narrow-leaved ironbark
	Poplar box / brigalow
	Poplar box / silver-leaved ironbark
	Poplar box on duplex soils
	Poplar box with mulga understorey
	Poplar box with sandalwood understorey
	Soft Mulga
	Mitchell grass downs
Floodplains	
Pebbly downs	
Soft gidgee	
Soft mulga	
Soft mulga sandridge	
Spinifex sandplains	
Moreton	Ironbarks and spotted gum ridges
	Ironbarks on granite
Mulga	Brigalow
	Gidgee
	Mulga sandplains
	Open alluvial plains
	Poplar box woodlands (red soils)
	Soft mulga
Northern gulf	Lancewood
	Range soils
	Sand ridge
Southern gulf	Lancewood
	Open red country
	Silverleaf box on open red country
	Silverleaf box with spinifex
	Spinifex plains
Wet Tropics	White sandy soils

Table S-4. Expected low pasture density land types

Region	Land type
Border Rivers	Jump-ups
	Yelarbon Desert
Channel country	Frequently flooded alluvial plains
	Gilgaied stony country
	Hard gibber and ironstone country
	Jump-ups / dissected residuals
	Mulga woodlands
	Occasionally flooded open plains
	Pebbly downs
	Sand dune country
Poorly drained swamps & depressions	
Coastal Burnett	Hoop pine scrub
	Softwood scrub
Darling Downs	Cypress pine sands
Desert uplands	Jump-ups
	Lakebeds
Fitzroy	Lancewood – bendee – rosewood
	Narrow-leaved ironbark with rosewood
	Softwood scrub
Inland Burnett	Softwood scrub
Maranoa Balonne	Bendee ridges
	Cypress pine on deep sands
	Hard mulga
	Softwood vine scrub on clay or loam
Mitchell grass downs	Hard gidgee
	Hard mulga
	Jump-ups
Moreton	Brigalow softwood scrub
	Rainforest (closed forest) on basalts
	Softwood vine scrub
Mulga	Dissected residuals (jump-ups)
	Hard mulga

Table S-5. Species that indicate waterlogging/salinity

Common name	Scientific name
Green couch	<i>Cynodon dactylon</i>
Common finger rush	<i>Fimbristylis dichotoma</i>
Samphire	<i>Halosarcia</i> spp
Samphire	<i>Holosarcia pergranulata</i>
Black tea-tree	<i>Melaleuca bracteata</i>
Tea tree	<i>Melaleuca irbyana</i>
Prickly leaved teatree	<i>Melaleuca nodosa</i>
Paper barked teatree	<i>Melaleuca quinquenervia</i>
Boobialla/water bush	<i>Myoporum acuminatum</i>
Marine couch	<i>Sporobolus virginicus</i>
Cumbungi	<i>Typha domingensis</i>
Yapunyah / Napunyah	<i>Eucalyptus thozetiana</i>
Coolibah	<i>Eucalyptus coolabah</i>
River red gum	<i>Eucalyptus camaldulensis</i>
Blue gum	<i>Eucalyptus tereticornis</i>
Myall	<i>Acacia pendula</i>
Sedges	<i>Cyperus</i> spp
Leopardwood	<i>Flindersia maculosa</i>

Part 6

Appendices

Appendix A—Relevant legislative provisions

Land Act 1994

An Act to consolidate and amend the law relating to the administration and management of non-freehold land and deeds of grant in trust and the creation of freehold land, and for related purposes.

155 Length of term leases

- (1) A term lease for land other than rural leasehold land must not be issued for more than 50 years.
- (2) However, a term lease for land other than rural leasehold land may be issued for up to 100 years if it is for—
 - (a) a significant development or the operation and maintenance of a significant development; or
 - (b) a timber plantation; or
 - (c) a development that involves existing improvements that in the opinion of the Minister have required a high level of investment.
- (3) A term lease for rural leasehold land must not be issued for more than 30 years.
- (4) However, a term lease for rural leasehold land may be issued for a term of no more than 40 years, if—
 - (a) the lease land is 1000ha or more; and
 - (b) the Minister is satisfied the lease land is in good condition.
- (5) Also, a term lease for rural leasehold land may be issued for a term of no more than 50 years, if—
 - (a) the lease land is 1000ha or more; and
 - (b) the Minister is satisfied the lease land is in good condition; and
 - (c) either or both of the following apply—
 - (i) if the Minister considers land (the relevant land) that is all or part of the lease land should be the subject of a conservation agreement or conservation covenant—a conservation agreement has been entered into, or a conservation covenant exists, for the relevant land;
 - (ii) if the Minister considers it is appropriate for there to be an indigenous cultural interest for all or part of the lease land—the lease land is subject to an indigenous cultural interest; and
 - (d) the Minister considers the term appropriate, having regard to either or both of the following for the lease land—
 - (i) the terms of any conservation agreement or conservation covenant;
 - (ii) the terms of any approved agreement for an indigenous cultural interest.
- (6) In addition, a term lease for rural leasehold land may be issued for a term of no more than 75 years if all of the following apply—
 - (a) the lease land is 1000ha or more;
 - (b) the Minister is satisfied the lease land is in good condition;
 - (c) all or part of the lease land (the declared land) is an area of international conservation significance under the Cape York Peninsula Heritage Act 2007;
 - (d) if the Minister considers land (the relevant land) that is all or part of the lease land should be the subject of a conservation agreement or conservation covenant—a conservation agreement has been entered into, or a conservation covenant exists, for the relevant land;
 - (e) the lease land is subject to an indigenous cultural interest;
 - (f) the Minister considers the term is appropriate, having regard to any or all of the following for the lease land—
 - (i) the terms of any conservation agreement or conservation covenant;
 - (ii) the terms of any approved agreement for an indigenous cultural interest;
 - (iii) the size of the declared land.
- (7) This section is subject to sections 155A, 155B and 155BA.

155AA Application of division 1B

- (1) This division applies to a term lease if—
 - (a) the lease is for rural leasehold land; and
 - (b) the lease land is 1000ha or more; and
 - (c) the term is 20 years or more; and
 - (d) there is a land management agreement for the lease; and
 - (e) more than 5 years have passed since the lease was entered into or the land management agreement was first registered, whichever is the later, unless the Minister is satisfied that special circumstances exist; and
 - (f) no more than 80% of the existing term of the lease has expired.
- (2) In this section— existing term, of the lease, does not include any extension of the lease granted under section 155A, 155B or 155BA.

155A Extensions for a term of up to 40 years

- (1) This section applies to a lease if—
 - (a) the term of the lease is less than 40 years; and
 - (b) the land management agreement for the lease contains a commitment by the Minister to extend the lease under this section; and
 - (c) the lease has not already been extended under this section.
- (2) The lessee may apply to extend the lease.
- (3) The Minister may grant the application and extend the lease if the Minister is satisfied—
 - (a) the lease land is in good condition; and
 - (b) the lessee has complied with the land management agreement and any requirements under it for the granting of the extension.
- (4) However, the term of the extension—
 - (a) can not be for more than 10 years; and
 - (b) must not extend the term of the lease beyond 40 years.

155B Extensions for a term of up to 50 years

- (1) This section applies to a lease if—
 - (a) the term of the lease is less than 50 years, including any extension of the term under section 155A; and
 - (b) the land management agreement for the lease contains a commitment by the Minister to extend the lease if either or both of the following circumstances apply—
 - (i) if the Minister considers land (the relevant land) that is all or part of the lease should be the subject of a conservation agreement or conservation covenant—a conservation agreement has been entered into, or a conservation covenant exists, for the relevant land;
 - (ii) if the Minister considers it is appropriate for there to be an indigenous cultural interest for all or part of the lease land—the lease land is subject to an indigenous cultural interest; and
 - (c) the lease has not already been extended under this section.
- (2) The lessee may apply to extend the lease.
- (3) The Minister may grant the application and extend the lease if the Minister is satisfied—
 - (a) the lease land is in good condition; and
 - (b) the lessee has complied with any land management agreement and any requirements under it for the granting of the extension; and
 - (c) the lessee has complied with the following for the lease land—
 - (i) any conservation agreement, or conservation covenant;
 - (ii) any approved agreement for an indigenous cultural interest; and

- (d) the extension is appropriate, having regard to either or both of the following for the lease land—
 - (i) the terms of any conservation agreement or conservation covenant;
 - (ii) the terms of any approved agreement for an indigenous cultural interest.
- (4) However, the extension—
 - (a) can not be for more than 10 years; and
 - (b) must not extend the term of the lease beyond 50 years.
- (5) If an extension is granted for a lease under this section at the same time as an extension for the lease is granted under section 155A—
 - (a) for subsection (4)(b), the term of the lease includes the extension granted under section 155A; and
 - (b) the extension granted under this section starts on the day after the day the extension granted under section 155A ends.

155D When Minister may reduce

- (1) This section applies to a term lease for rural leasehold land granted for a term mentioned in section 155(3) to (6) or extended under section 155A, 155B or 155BA, if any of the following happens (each a relevant circumstance)—
 - (a) if, when the lease was granted or extended, the Minister was satisfied the land was in good condition—the Minister considers the land is no longer in good condition;
 - (b) if a conservation covenant existed or a conservation agreement had been entered into for the land when the lease was granted or extended—
 - (i) the covenant or agreement ceases to be in effect for the land; or
 - (ii) the Minister considers the lessee has not complied with the terms of the covenant or agreement;
 - (c) if the lease land was subject to an indigenous cultural interest when the lease was granted or extended—
 - (i) the interest ceases to be in effect for the land; or
 - (ii) the Minister considers the lessee has not complied with the terms of the approved agreement for the interest;
 - (d) for a lease granted for a term of up to 75 years under section 155(6) or extended under section 155BA—all or any part of the land ceases being an area of international significance under the Cape York Peninsula Heritage Act 2007.
- (2) Subject to sections 155DA and 155E, the Minister may reduce the term of the lease by the number of years the Minister considers appropriate, having regard to the maximum term for which the lease would have been granted or extended if the relevant circumstance had existed at the time of the grant or extension.
- (3) However, the Minister can not reduce the term by an amount that results in the lease no longer having an unexpired term.
- (4) In this section— term, of a lease, includes any extension of the term of the lease under section 155A, 155B or 155BA, whether or not the extended term has commenced.

159 General provisions for deciding application

- (1) The chief executive must consider the following before deciding whether or not to offer a new lease, the conditions of the offer or the imposed conditions of the new lease—
 - (a) the interest of the lessee;
 - (b) whether part of the lease land should be set apart and declared as State forest under the Forestry Act 1959;
 - (c) whether the public interest could be adversely affected, other than for an issue mentioned in paragraph (b), if the lease were renewed;
 - (d) whether part of the lease land is needed for environmental or nature conservation purposes;
 - (e) the condition of the lease land;
 - (f) the extent to which the lease land suffers from, or is at risk of, land degradation;

- (g) whether the lessee has complied with, or to what extent the lessee has complied with, the following—
 - (i) the conditions of the lease;
 - (ii) any land management agreement for the lease;
 - (iii) any conservation agreement or conservation covenant applying to all or part of the lease land;
 - (iv) any approved agreement for an indigenous cultural interest for the lease land;
 - (h) whether part of the lease land has a more appropriate use from a land planning perspective;
 - (i) whether part of the lease land is on an island or its location, topography, geology, accessibility, heritage importance, aesthetic appeal or like issues make it special;
 - (j) whether part of the lease land is needed for a public purpose;
 - (k) whether a new lease is the most appropriate form of tenure for the lease land;
 - (l) the lessee’s record of compliance with this Act;
 - (m) the natural environmental values of the lease land.
- (2) To remove any doubt, it is declared that, to the extent the lease land is in an urban area, the chief executive need not consider any issue that is not relevant to an urban environment. Example of an issue not relevant to an urban environment— whether part of the lease land should be set apart and declared as State forest
- (3) In considering the natural environmental values of the lease land, the matters to which the chief executive must have regard include any advice about the values the chief executive receives from the NCA department.

176V Purposes of a land management agreement

The purposes of a land management agreement for a lease are to do each of the following to the extent they are relevant to the lease land—

- (a) identify and describe the natural and physical attributes of the lease land, including its known indigenous and other cultural heritage and significant natural environmental values;
- (b) record the condition of the lease land at a particular point in time;
- (c) improve or maintain its condition so that it is, or will be, at least in good condition;
- (d) identify any land degradation issues relating to the land;
- (e) establish the agreed management outcomes for the identified land degradation issues and the associated management strategies to address them;
- (f) identify measures to protect the known indigenous and other cultural heritage and the identified significant natural environmental values;
- (g) establish a monitoring and reporting program;
- (h) establish a process to verify the performance of the lessee in relation to the outcomes;
- (i) establish a dispute resolution process;
- (j) establish a review process to maintain the relevance and effectiveness of the agreement.

Appendix B—Principles for evaluating the appropriateness of the draft guidelines for assessing lease land condition

The State Rural Leasehold Land Ministerial Advisory Committee agreed to the following criteria for assessing the appropriateness of the guidelines.

The guidelines must:

1. Be practical

The assessment process must:

- (a) Collect information that is useful and understandable to the landholder for property management purposes; and useful to the government for leasehold land management and administration.
- (b) Use terminology, concepts and processes that landholders relate to.
- (c) Be practical from an implementation perspective – e.g. field assessment of remote and inaccessible areas is impractical.
- (d) Include indicators that are responsive to change - that is, indicators of land condition, not the inherent properties of the ecosystem.
- (e) Be at a scale that is suitable for rural leasehold land.
- (f) Align with other government and non government resource condition assessment processes.

2. Conform with legislation

The assessment process must:

- (a) Comply with the Government's legislative and policy settings.

3. Be based on science

The assessment process must be:

- (a) Scientifically sound and peer reviewed prior to implementation.
- (b) Structured so that different assessors achieve relatively consistent findings.
- (c) Repeatable over time as well as space, with associated recording, storage, security and access provisions appropriate for its purpose.
- (d) Based on available science.
- (e) Validated by reference sites wherever possible.
- (f) Based on research applicable to the assessment or management of Australian rangelands.

4. Inform on the health of all landscape components

The assessment process must:

- (a) Either directly assess or infer the health of soil, pasture, water, other vegetation, ecosystems, fauna and the presence of invasive and feral species, and allow for the impacts of variation in weather.
- (b) Assess each of the natural resource dimensions identified under Duty of Care in the Land Act.
- (c) Be independent from climate. That is, assess land condition, not forage condition.

5. Be socio-economically acceptable

The assessment process must:

- (a) Recognise the agricultural, grazing or pastoral purposes for which rural leasehold land has been granted.
- (b) Contribute to fostering and supporting sustainable, liveable and prosperous rural communities, in accordance with the Blueprint for the Bush.
- (c) Assess the condition of the land, irrespective of:
 - (i) historic influences, such as past management practices; or
 - (ii) the nature of any development on the lease.
- (d) Acknowledge that every lease will have sacrifice areas, e.g. land near watering points and stockyards.

6. Assess the lease as a whole

The assessment process must:

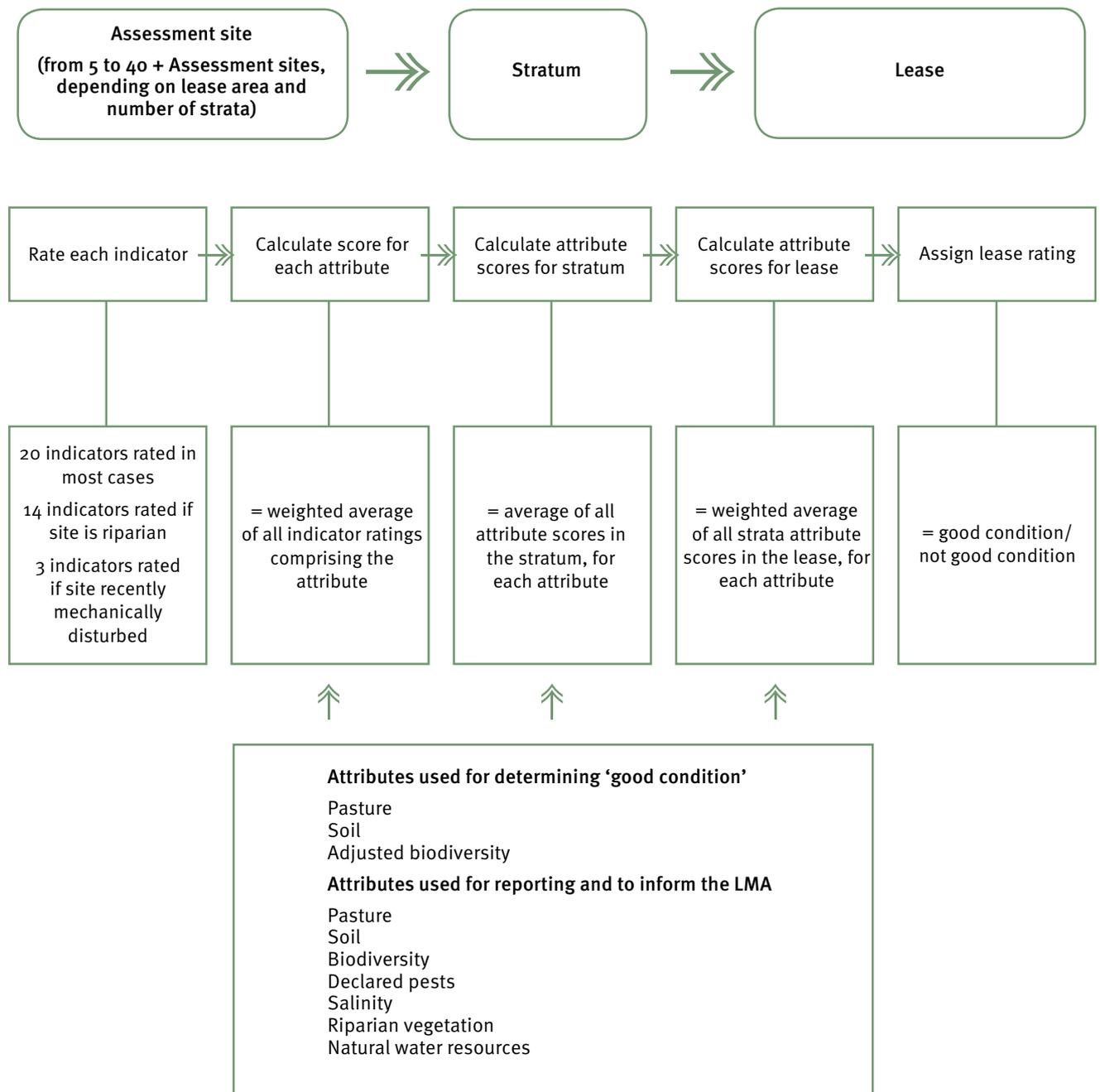
- (a) Decide condition for the whole lease.
- (b) Be based on indicators that:
 - (i) assess land degradation risk; and
 - (ii) have flow on impacts to other landscape components.
- (c) Take into account variability in condition across the lease.
- (d) Take into account variability in the condition of different natural resource dimensions.

7. Be flexible and adaptable

The assessment process must be able to:

- (a) Accommodate new knowledge and science as it becomes available.
- (b) Be responsive to climate change and the implications this may have on species and ecosystem change.

Appendix C—Attribute score calculation process



Appendix D—Indicators and weights for each attribute

Table S-6 – Indicators, Attributes and Weights of the Land Type Strata

Indicators of sites in the land type strata	Attributes of the land type strata					
	Pasture	Soil	Adjusted biodiversity	Biodiversity	Declared pests	Salinity
Proportion of preferred species	5					
Density of preferred species	5					
Proportion of intermediate (and preferred) species	3					
Density of intermediate (and preferred) species	3					
Health of preferred & intermediate species	5					
Proportion of non-preferred species	5					
Density of non-preferred species	5					
Soil surface condition		5				
Ground cover		4 ⁺				
Declared pest plants			5*	5*	5	
Declared pest animals			2	2	5	
Proportion of native ground layer species			5	5		
Density of native ground layer species			3	3		
Large trees			4	4		
Shrub layer			4	4		
Woody debris and litter			3	3		
Recruitment of woody perennial species			3	3		
Non-native species – excluding declared pest plants			4	4		
Size of patch			4	4		
Salinity		4				5

*The weight on this indicator varies according to the slope of the site. On sites with a slope of 3 per cent or less, the weighting is 4. On sites with a slope greater than 3 per cent, the weighting is 5.

*The weight on this indicator is 5, other than in the following instances when the rating of the declared pest plant indicator is 3 or 4, and the average of the other (non declared pest) biodiversity indicators are >0, but <2.

If the rating of the declared pest plant indicator is 3 and the average of the other (non declared pest) biodiversity indicators is:

- <=2, the weighting is 23
- <3, the weighting is 18.

If the rating of the declared pest plant indicator is 4 and the average of the other (non declared pest) biodiversity indicators is:

- <=3, the weighting is 18
- <4, the weighting is 12..

Table S-7 – Indicators, Attributes and Weights of Riparian Areas

Indicators of sites in riparian areas	Attributes of sites in riparian areas							
	Pasture	Soil	Adjusted biodiversity	Biodiversity	Declared Pests	Salinity	Riparian Vegetation	Natural Water Resources
Bank instability		4						4
Riparian area disturbance			3	3			4	3
Groundcover		4 ⁺						4 ⁺
Proportion of native ground layer species			5	5			5	
Density of native ground layer species			3	3			3	
Large trees			4	4			4	
Shrub layer			4	4			4	
Woody debris and litter			3	3			3	
Recruitment of woody perennial species			3	3			3	
Non-native species – excluding declared pest plants			4	4			4	
Size of patch			4	4			4	
Declared pest plants			5 [*]	5 [*]	5		5 [*]	
Declared pest animals			2	2	5		2	
Salinity		4				5		3

Table S-8 – Indicators, Attributes and Weights of the recently mechanically disturbed stratum

Indicators of sites in the recently mechanically disturbed stratum	Attributes of the recently mechanically disturbed stratum	
	Soil	Declared Pests
Potential soil erosion	5	
Declared pest plants		5
Declared pest animals		5

Appendix E—Blank assessment sheets

Assessment site identification			
Property/Lease Name		Slope	
Lot/Plan or TR		Land use	
Site number		Land type	
Date		Bioregion	
Time		GLM region	
Officer ID		Developed—not RE?	
Datum and zone		Riparian?	
Easting		Annually dominated?	
Northing		Mechanically disturbed?	

Site description			
Photo numbers		Tree basal area (m ² /ha)	
		Basal area factor (BAF)	Count (live)
Tree basal area estimate (live)	m ² /ha	Centre location (loc.)	
		25m North loc.	
		25m East loc.	
Ground cover estimate or measure	% (Est.)	25m South loc.	
		25m West loc.	
		Sub total (counts)	
Comments		TBA = sub total x BAF/no. of loc's	m ² /ha

	Species	Dominant	Co-dominant	Associated	Suppressed	Crown Separation Ratio	Height range	Avg height	Structure
									cm
Dominant pasture species								cm	
								cm	
								cm	
								cm	

Midstorey species							m	m	
							to	m	
							m	m	

Overstorey species							m	m	
							to	m	
							m	m	

Encroachment species									

	Species	Reproductive status	Treatment
Declared plant species			

	Species	Comments
Declared animal species		
	Species	Comments
Native fauna species		

Indigenous cultural heritage	

Post contact cultural heritage	

Notes	

Crown separation					
Foliage projective cover	70–100%	30–70%	10–30%	<10%	≈< 0.20
Crown separation	closed	open	sparse	very sparse	isolated
Field criteria	touching-overlapping	touching-slight separation	clearly separated	well separated	isolated (plants/clumps)
Crown separation ratio	<0	0–0.25	0.25–1	1–20	>20
Structure					
Foliage projective cover	70–100%	30–70%	10–30%	<10%	≈< 0.20
Crown cover %	>80%	50–80%	20–50%	<20%	<0.20
Growth form	Structural Formation Classes (qualified by height)				
trees 30m	tall closed-forest	tall open-forest	tall woodland	tall open-woodland	tall isolated trees/clumps
trees 10–30m	closed-forest	open-forest	woodland	open-woodland	isolated trees/clumps
trees <10m	low closed-forest	low open-forest	low woodland	low open-woodland	low isolated trees/clumps
shrubs 2–8m	closed-shrub	open-shrub	tall shrubland	tall open-shrubland	tall isolated shrubs/clumps
shrubs 1–2m	closed-heath	open-heath	shrubland	open-shrubland	isolated shrubs/clumps
shrubs <1m			dwarf shrubland	dwarf open-shrubland	isolated shrubs/clumps
succulent shrub			succulent shrubland	open succulent shrubland	isolated succulent shrubs
hummock grasses			hummock grassland	open hummock grassland	isolated hummock grasses
tussock grasses	closed tussock grassland	tussock grassland	open tussock grassland	sparse tussock grassland	isolated tussock grasses
herbs	closed herbland	herbland	open herbland	sparse herbland	isolated herbs
forbs	closed forbland	forbland	open forbland	sparse forbland	isolated forbs
sedges	closed sedgeland	sedgeland	open sedgeland	sparse sedgeland	isolated sedges
vines	closed vineland	vineland	open vineland	sparse vineland	isolated vines

Site assessment indicators and ratings						
Property Name:		Site Number:	Date:		Assessed by:	
Indicators for sites in land types						
Indicator	Rating	0	1	2	3	4
Pasture attribute						
1 Proportion of preferred species		Annual LT; or Hard Gibber/ Ironstone LT; or no thinning RE, tba>20	Preferred spp >80%	Preferred spp 61–80%	Preferred spp 10–60%	Preferred spp <10%
2 Density of preferred species			Closed & evenly distributed	Open & even; or partly closed & uneven	Sparse & even; or partly open & uneven	Very sparse & even; or partly sparse & uneven; or absent
3 Proportion of intermediate (and preferred) species		Rating 1 for Inds 1 and 2; or Annual LT; Hard Gibber/ Ironstone LT; or no thinning RE, tba>20	Intermediate (& Pref) spp >80%	Intermediate (& Pref) spp 61–80%	Intermediate (& Pref) spp 10–60%	Intermediate (& Pref) spp <10%
4 Density of intermediate (and preferred) species			Closed & evenly distributed	Open & even; or partly closed & uneven	Sparse & even; or partly open & uneven	Very sparse & even; or partly sparse & uneven; or absent
5 Health of preferred and intermediate species		Preferred or Intermediate species <10% of site; or Annual LT; Hard Gibber/ Ironstone LT; or no thinning RE tba>20	>70% alive	31–70% alive	10–30% alive	<10% alive
6 Proportion of non-preferred species		No thinning RE tba>20	<10%	10–60%	61–80%	>80%
7 Density of non-preferred species			Very sparse & even; or partly sparse & uneven; or absent	Sparse & even; or partly open & uneven	Open & even; or partly closed & uneven	Closed & evenly distributed
Soil attribute						
8 Soil surface condition		N/A	Very little evidence of soil erosion	Minor soil erosion or disturbance; or exposed subsoil <5% of site	Moderate soil erosion; or exposed subsoil 6–10% of site	Severe soil erosion; or exposed subsoil >10% of site
9 Ground cover		N/A	>70%, Uniform & even	40–70% U&E or >70% if uneven	15–39% U&E or 40–70% if uneven	<15% U&E or 15–39% if uneven
10 Salinity		N/A	Plant spp indicating sal present but no bare caused by sal	Plant spp indicating sal present but sparse and bare caused by sal 1–5%	Plant spp indicating sal common and bare caused by sal 6–10%	Plant spp indicating sal dominant and bare caused by sal >10%; eroded
Biodiversity attribute						
Attribute assessed but not used in calculation if site is not an RE due to vegetation clearing or development (consistent with Govt policy at time)						
11 Proportion of native ground layer species		Annual LT; or Hard Gibber/ Ironstone LT; or no thinning RE tba>20; or >25% ground layer invasive exotic pasture spp	>80% native preferred and intermediate spp	61–80% native preferred and intermediate spp	10–60% native preferred and intermediate spp	<10% native preferred and intermediate spp
12 Density of native ground layer species			Closed & evenly distributed	Open & even; or partly closed & uneven	Sparse & even; or partly open & uneven	Very sparse & even; or partly sparse & uneven; or absent
13 Large trees		Grassland RE and no native trees present; or prev cleared	>70% native, large mature trees	31–70% native, large mature trees	10–30% native, large mature trees	<10% native, large mature trees; or native trees are excessively dense relative to the RE

14 Shrub layer		Grassland RE and no native shrubs present; or prev cleared	Native shrub density within expected range	Native shrub density approaching expected range	Native shrub density not within expected range but not excessively dense or sparse	Native shrub density not within expected range but is excessively dense or absent
15 Woody debris and litter		Grassland RE and no trees present; or prev cleared	Frequent but not excessive logs, wood, litter	Moderate logs, wood, litter	Occasional logs, wood, litter	Absence or excessive presence of logs, wood, litter
16 Recruitment of woody perennial species		Grassland RE and no native trees present; or prev cleared	Strong evidence (>75%) native woody species successfully regenerating	Some evidence (20-75%) native woody species successfully regenerating	Little evidence (<20%) native woody species successfully regenerating	No evidence of native woody species regeneration
17 Non-native species - excluding declared pest plants		N/A	Non-native species <5% of ground layer	Non-native species 5–25% of ground layer	Non-native species 26–50% of ground layer	Non-native species >50% of ground layer
18 Size of patch		Site in subregion >65% remnant vegetation and site has remnant vegetation	Site within patch of remnant vegetation >100 ha	Site within patch of remnant vegetation 31–100 ha	Site within patch of remnant vegetation 10–30 ha	Site within patch of remnant vegetation 10 ha; or is not remnant
19 Declared pest plants		N/A	0% canopy cover; and no succulents	<10% canopy cover; or 1–3 stems of succulent	10–30% canopy cover; or 4–10 prickly pear; or 4-20 M of M; or 4-6 stems of other succ.	>30% canopy cover; or >10 prickly pear; or >20 M of M; or >6 stems of other succ.
20 Declared pest animals		N/A	N/A	Little evidence observed	Significant evidence and/or observed	N/A
Indicators for sites in riparian areas						
11 Proportion of native ground layer species		Annual LT; or Hard Gibber/Ironstone LT; or no thinning RE	>80% native preferred and intermediate spp	61–80% native preferred and intermediate spp	10–60% native preferred and intermediate spp	<10% native preferred and intermediate spp
12 Density of native ground layer species		tba>20; or >25% ground layer invasive exotic pasture spp	Closed & evenly distributed	Open & even; or partly closed & uneven	Sparse & even; or partly open & uneven	Very sparse & even; or partly sparse & uneven; or absent
13 Large trees		Grassland RE and no native trees present; or prev cleared	>70% native, large mature trees	31–70% native, large mature trees	10–30% native, large mature trees	<10% native, large mature trees; or native trees are excessively dense relative to the RE
14 Shrub layer		Grassland RE and no native shrubs present; or prev cleared	Native shrub density within expected range	Native shrub density approaching expected range	Native shrub density not within expected range but not excessively dense or sparse	Native shrub density not within expected range but is excessively dense or absent
15 Woody debris and litter		Grassland RE and no trees present; or prev cleared	Frequent but not excessive logs, wood, litter	Moderate logs, wood, litter	Occasional logs, wood, litter	Absence or excessive presence of logs, wood, litter
16 Recruitment of woody perennial species		Grassland RE and no native trees present; or prev cleared	Strong evidence (>75%) native woody species successfully regenerating	Some evidence (20–75%) native woody species successfully regenerating	Little evidence (<20%) native woody species successfully regenerating	No evidence of native woody species regeneration
17 Non-native species – excluding declared pest plants		N/A	Non-native species <5% of ground layer	Non-native species 5–25% of ground layer	Non-native species 26–50% of ground layer	Non-native species >50% of ground layer

18 Size of patch		Site in subregion >65% remnant vegetation and site has remnant vegetation	Site within patch of remnant vegetation >100 ha	Site within patch of remnant vegetation 31–100 ha	Site within patch of remnant vegetation 10–30 ha	Site within patch of remnant vegetation <10 ha; or is not remnant
19 Declared pest plants		N/A	0% canopy cover; and no succulents	<10% canopy cover; or 1–3 stems of succulent	10–30% canopy cover; or 4–10 prickly pear; or 4–20 M of M; or 4–6 stems of other succ.	>30% canopy cover; or >10 prickly pear; or >20 M of M; or >6 stems of other succ.
20 Declared pest animals		N/A	N/A	Little evidence observed	Significant evidence and/or observed	N/A
31 Riparian area disturbance		N/A	Little evidence of disturbance; or area fenced; or offstream water points	Evidence of perm. livestock tracks; pads; or vehicular access	Heavily disturbed by livestock tracks; pads; or vehicular access	Livestock tracks; pads; vehicular access causing severe riparian soil erosion
9 Ground cover		N/A	>70%, Uniform & Even	40–70% U&E or >70% if uneven	15–39% U&E or 40–70% if uneven	<15% U&E or 15–39% if uneven
10 Salinity		N/A	Plant spp indicating sal present but no bare caused by sal	Plant spp indicating sal present but sparse and bare caused by sal 1–5%	Plant spp indicating sal common and bare caused by sal 6–10%	Plant spp indicating sal dominant and bare caused by sal >10%; eroded
34 Bank instability		N/A	Banks stable; erosion or bank failure absent or minimal; <5% bank affected	Banks moderately stable; infrequent small areas; 5–30% of bank has areas of erosion	Banks moderately unstable; 31–60% areas of erosion; high erosion potential in flood	Banks unstable; many eroded areas; raw areas frequent; sloughing; >61% eroded
Indicators for sites recently mechanically disturbed						
35 Potential soil erosion		N/A	All of: approp erosion control measures; >30% cover; no erosion	2 of: erosion control measures; >30% cover; no erosion	1 of: erosion control measures; >30% cover; no erosion	No erosion control measures; <30% cover; severe erosion
19 Declared pest plants		N/A	0% canopy cover; and no succulents	<10% canopy cover; or 1–3 stems of succulent	10–30% canopy cover; or 4–10 prickly pear; or 4–20 M of M; or 4–6 stems of other succ.	>30% canopy cover; or >10 prickly pear; or >20 M of M; or >6 stems of other succ.
20 Declared pest animals		N/A	N/A	Little evidence observed	Significant evidence and/or observed	N/A

Ground cover transect—basic

Lease name:

Site number:

Date:

Recorded by:

Photos:

Per can = perennial grass canopy; Per base = perennial grass base; Other = soft litter, woody litter, forbs, annuals, cryptogams

	Bare	Rock	Per Can	Per Base	Other		Bare	Rock	Per Can	Per Base	Other	Notes				
1						51										Notes
2						52										
3						53										
4						54										
5						55										
6						56										
7						57										
8						58										
9						59										
10						60										
11						61										
12						62										
13						63										
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15						65										
16						66										
17						67										
18						68										
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36						86										
37						87										
38						88										
39						89										
40						90										
41						91										
42						92										
43						93										
44						94										
45						95										
46						96										
47						97										
48						98										
49						99										
50						100										
	Totals						Totals									

Ground cover transect— detailed

Lease name:

Site number:

Date:

Recorded by:

Photo's:

Per can = perennial grass canopy; Per base = perennial grass base; Other = soft litter, woody litter, forbs, annuals, cryptogams

	Ba	Ro	PC	PB	Ba	WL	FC	FB	AC	AB	Cr	MC	MS	De
1														
2														
3														
4														
5														
6														
7														
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41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
	Totals													

Notes:

Ground cover transect— Detailed

Lease name:	Site number:	Date:
-------------	--------------	-------

Recorded by:	Photo's:
--------------	----------

Per Can = perennial grass canopy; Per Base = perennial grass base; Other = soft litter, woody litter, forbs, annuals, cryptogams

	Ba	Ro	PC	PB	Ba	WL	FC	FB	AC	AB	Cr	MC	MS	De
51														
52														
53														
54														
55														
56														
57														
58														
59														
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93														
94														
95														
96														
97														
98														
99														
100														
	Totals													

Notes:

Mobile Observations

Property/Lease Name:				Date:			
GPS Zone and Datum:				Recorded by:			
	East/Lon	North/Lat	Mobile Observation/Photo No.		East/Lon	North/Lat	Mobile Observation/Photo No.
001				051			
002				052			
003				053			
004				054			
005				055			
006				056			
007				057			
008				058			
009				059			
010				060			
011				061			
012				062			
013				063			
014				064			
015				065			
016				066			
017				067			
018				068			
019				069			
020				070			
021				071			
022				072			
023				073			
024				074			
025				075			
026				076			
027				077			
028				078			
029				079			
030				080			
031				081			
032				082			
033				083			
034				084			
035				085			
036				086			
037				087			
038				088			
039				089			
040				090			
041				091			
042				092			
043				093			
044				094			
045				095			
046				096			
047				097			
048				098			
049				099			
050				100			

Notes:

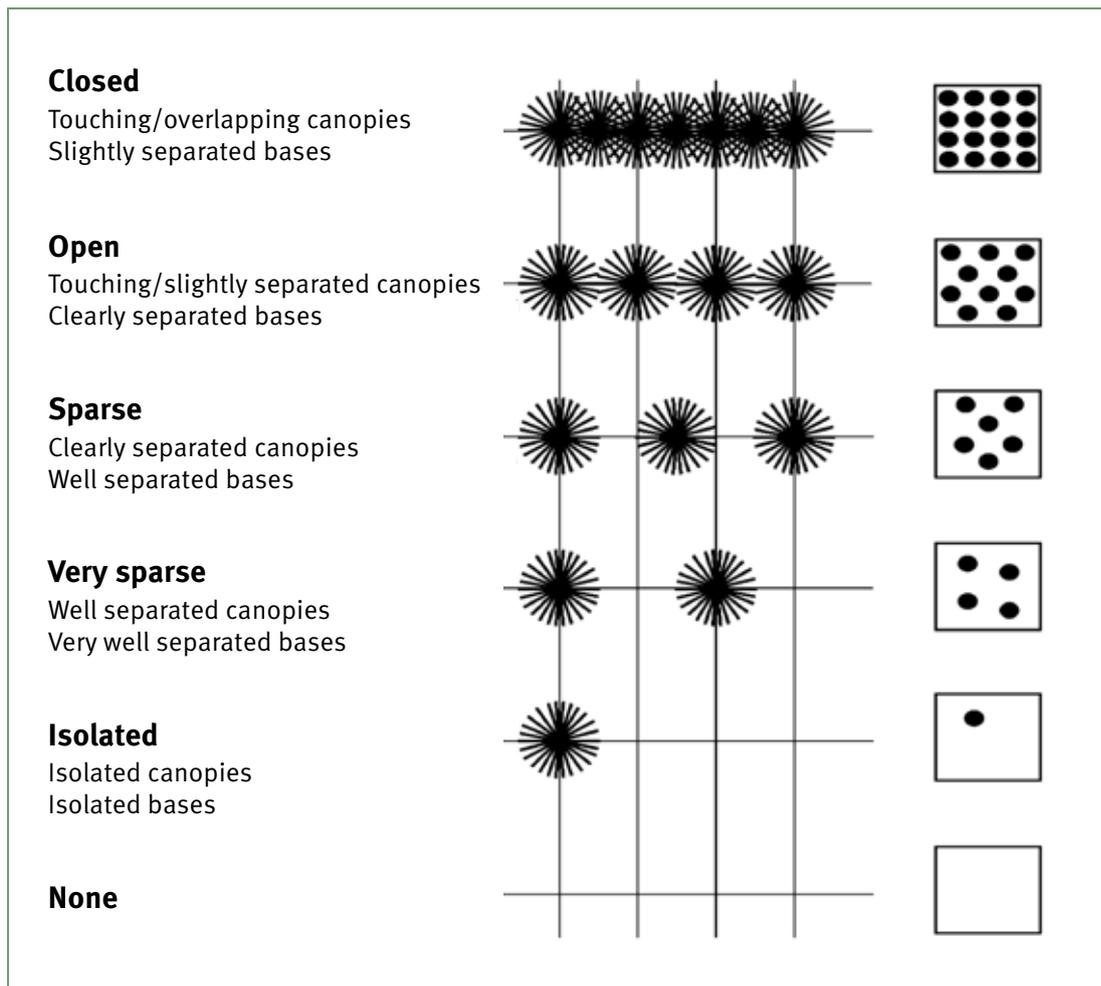
Appendix F— Density diagrams

Plant density is the ‘closeness’ of the plants to each other. Are they close together or far apart? Standard terms used to describe the range of density are: closed; open; sparse; very sparse; isolated; none.

These density terms may be applied to describe the density of pasture plants, shrubs, trees and declared pest plants. The terms are used for all purposes within the Guidelines.

The diagram below represents symbols arranged in patterns that are associated with standard density terms. In the symbols to the left, the outer lines represent the pasture, shrub or tree canopy and the dark inner area, the pasture plant base or the shrub or tree stem or trunk.

The relative closeness of these diagrams is then represented in the ‘box’ diagrams to the right. The box size reflects an area of average density of pasture or other plants. For example, the box area may represent a 1 ha (100m x 100m) site.



Appendix G— Cover diagrams

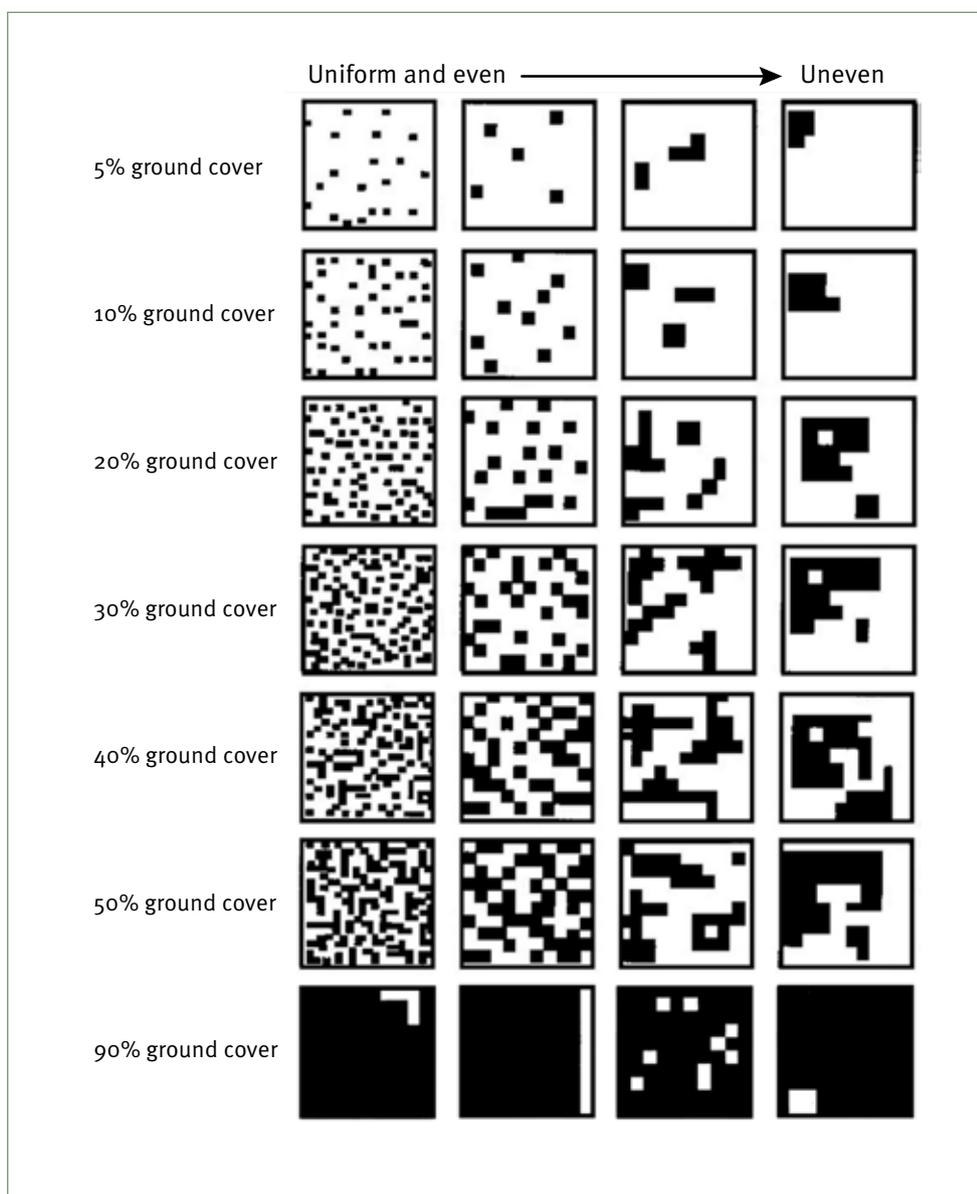
The box diagrams below represent percentages of groundcover and its general distribution.

The box sizes in the diagrams represent an area within which the average ground cover can be readily determined. Typically the box area represents a 1 ha (100 m x 100 m) site however it may be easier to assess an average of 10m² or 1m².

The black shapes (pixels) represent ground cover (thus the white areas represent bare ground). Various ground cover amounts (as a percentage) may be evenly spread across the site or distributed in patches (as shown from left to right).

Total ground cover is assessed within the Guidelines. It includes pasture plants and their litter; tree and shrub leaf litter; twigs and woody debris; organic crusts; rocks and gravel. All of these components contribute to protecting the soil surface from current and future erosion; even if the protection is from rocks and gravel caused by previous erosion.

The most valuable form of ground cover is organic ground cover. It includes all organic cover only (i.e. excludes rocks and gravel). Organic ground cover, such as established perennial ground layer plants (pastures), provide stability and assist nutrient cycling and infiltration.



Glossary

Alive—green or senesced (typically beige to brown in colour) and not grey to black.

Alluvial land type—a land type listed in Table S–1.

Annually dominated land type—is any of the following land types:

- a) frequently flooded alluvial plains;
- b) occasionally flooded open plains;
- c) poorly drained swamps and depression; or
- d) hard gibber and ironstone country.

Annual species—a plant species that generally germinates, flowers and dies in one year.

Attribute—a feature of the land that will be assessed during the land condition assessment. The list of attributes includes: pasture, soil, declared pests, ecosystem health, salinity, riparian vegetation and natural water resources.

Base—the cross-section through the plant base in contact with the ground.

Bedrock—the solid rock underlying the soil profile or other surface materials.

Closed—the pasture plants are touching or overlapping.

Cryptogam—an organism that reproduces by spores rather than seeds (e.g. alga, fungus, moss or fern).

Declared—either:

- a) a plant or animal species listed in Schedule 2 of the Land Protection (Pest and Stock Route Management) Regulation 2003; or
- b) an exotic plant that is listed in a local government pest management plan.

Ecologically dominant layer or species—the layer or species making the greatest contribution to the overall biomass of the site and the vegetation.

Emergent layer—the tallest layer that does not form the most above ground biomass, regardless of its canopy cover, e.g. *Eucalyptus populnea* trees above a low woodland of mulga.

Established—a perennial grass plant that has:

- a) flowered, is well rooted in the soil, and has a mean basal diameter of at least 1 cm; or
- b) runners, if it is a stoloniferous species.

Exotic—a species that was not present in Australia until after 1788.

Expected high density land type—any of the land types listed in Table S–2 if the tree basal area is in the range of less than 4m²/ha.

Expected moderate density land type—any of the land types listed in:

- a) Table S–3 if the tree basal area is less than 4m²/ha; or
- b) Table S–2 if the tree basal area is in the range of 4–10m²/ha.

Expected low density land type—any of the land types listed in:

- a) Table S–4 if the tree basal area in and surrounding the site is in the range of less than 4m²/ha; or
- b) Table S–3 if the tree basal area in and surrounding the site is in the range of 4–10m²/ha; or
- c) Table S–2 if the tree basal area in and surrounding the site is greater than 10m²/ha.

Forb—a broad-leaved herbaceous (i.e. non-woody) plant (i.e. not a grass).

Grassland regional ecosystem—a remnant regional ecosystem described as having a structure code which does not include the terms ‘forest’, ‘scrub’, ‘vineland’, ‘shrubland’, ‘heath’ or ‘woodland’ in the Regional Ecosystem Database found at <http://www.ehp.qld.gov.au/ecosystems/biodiversity/regional-ecosystems/index.php>

Ground cover—any of the following: plant material (alive or dead, attached or detached); leaf litter; dung; sticks; lichen; rocks, stones, gravel, twigs and logs.

Ground layer—the layer of vegetation that is usually <2 m tall and is dominated by grasses and herbs but which can also contain forbs and sprawling vines.

Gully—a channel more than 30 cm deep, often with short precipitous sides and a moderately to very gently inclined floor or a small stream channel.

Inaccessible stratum—a land type that:

- a) has no access tracks to, through or from the stratum that can be traversed by a 4WD vehicle, and is further than 200 m from any other access track;
- b) is generally considered ungrazed by domestic stock.

Indicators—qualities of an attribute that are given a rating during the assessment process.

Intermediate species—all perennial grass species that are not weed species and are any of the following:

- a) not recognised as preferred or non-preferred species;
- b) Indian couch (*Bothriochloa pertusa*) if it is listed in a land type information sheet as a ‘preferred species’, ‘intermediate species’ or ‘suitable sown pastures’; or
- c) an introduced legume species that is listed in a land type sheet as a ‘preferred species’ or ‘suitable sown pasture’ if the legume species comprises 26–50% of either TSDM or total pasture bases; or
- d) an *Aristida* species in any of the following regional ecosystems: 1.3.4; 1.5.4 (numerous sub.); 1.5.6; 1.7.1k; 1.7.1x3; 1.9.1a; 1.9.1x2; 2.3.9; 2.3.10c; 2.3.18; 2.3.29; 2.3.31; 2.3.32; 2.3.33 (mixed); 2.3.35; 2.3.36; 2.5.1 (numerous); 2.5.2 (numerous); 2.5.6 (numerous); 2.5.7; 2.5.9 (numerous); 2.5.12a; 2.5.12c; 2.5.14 (numerous); 2.5.15 (numerous); 2.5.16; 2.7.2 (numerous); 2.10.1; 2.10.5x1; 3.3.47; 3.3.52; 3.3.56; 3.5.27; 3.10.6x1; 3.10.6x1b; 5.7.9; 5.7.10; 6.3.16; 6.7.13; 9.3.24; 9.3.26; 9.5.13; 9.10.1; 9.10.3; 9.11.28; 9.12.6 (numerous); 9.12.9; and 9.12.38.
- e) non-preferred and/or *Schizachyrium* species which are naturally significant ($\geq 10\%$) as defined in a regional ecosystem technical description

Land types—areas of grazing land with a characteristic pattern of soil and vegetation that have been identified by Queensland’s Department of Agriculture, Fisheries and Forestry. The land types of Queensland are listed at www.futurebeef.com.au

Land type information sheet—a description of a land type, indicating, among other things, the preferred, non-preferred and other pasture species to be found in a land type depending on its condition, and the range of soils that a particular land type may be associated with. Land type information sheets can be found at www.futurebeef.com.au

Land type strata—areas that are not in the recently mechanically disturbed stratum and are not riparian areas.

Large mature trees—defined for each regional ecosystem in benchmark data found at <http://www.ehp.qld.gov.au/ecosystems/biodiversity/biocondition.html>. If benchmark data are not available for the regional ecosystem, a large mature tree is one that has reached its maximum lateral crown extension.

Logs—defined as fallen woody material >0.5 metres in length and >10 centimetres in diameter.

Native preferred species—those species that are native to Australia and that are listed as preferred in the land type information sheets.

Non-preferred—any species listed in a land type information sheet as either a:

- a) ‘non-preferred species’; or
- b) a legume species that is listed in a land type sheet as a ‘preferred species’ or ‘suitable sown pasture’ if the legume species comprises $>50\%$ of either TSDM or total pasture bases.

Open—pasture plants are slightly separated.

Over-storey—the vegetation that is taller than the shrub layer.

Pasture—grass or herbage, used or suitable for the grazing of domestic stock. Includes (but not exclusively) all species listed in land type information sheets under Expected native pasture composition; Expected pasture composition; Suitable sown pastures; or Legumes.

Perennial species—a plant species that lives for more than two years.

Plant species that may indicate water logging and/or **salinity** are listed in table S–5.

Preferred species—any of the following:

- a) a perennial grass species identified in the land type information sheet as a preferred species, other than Indian couch (*Bothriochloa pertusa*),
- b) a legume species that comprises <25% of either TSDM or total pasture bases, if identified in a land type information sheet as a ‘preferred species’ or ‘suitable sown pasture’;
- c) *Chrysopogon fallax* (Golden Beard) in any of the following regional ecosystems: 2.3.32; 2.5.1 (numerous); 2.5.6 (numerous); and 2.10.1.

Rating—the process of assigning a value to an indicator depending upon its condition.

Recently mechanically disturbed—areas that are permanently cultivated or occasionally cultivated or blade ploughed (but not for land reclamation) within the last 12 months.

REDD—the Regional Ecosystem Description Database found at <http://www.ehp.qld.gov.au/ecosystems/biodiversity/regional-ecosystems/index.php>.

Regional ecosystem—a vegetation community in a bioregion that is consistently associated with a particular combination of geology, landform and soil.

Regional ecosystem where thinning cannot occur—is a regional ecosystem listed in a table titled ‘Regional ecosystems where thinning cannot occur’ in either the:

- a) Regional Vegetation Management Code for Western bioregions (Table 5),
- b) Regional Vegetation Management Code for Brigalow Belt and New England Tableland bioregions (Table 6),
- c) Regional Vegetation Management Code for Southeast Queensland bioregion (Table 3) or
- d) Regional Vegetation Management Code for Coastal bioregions (Table 4).

The Regional Vegetation Management Codes are available at www.dnrm.qld.gov.au.

Relative to the regional ecosystem—for a regional ecosystem, as described in:

- a) benchmark data developed by the DEHP, which is based on best on offer site(s) and other relevant material. Benchmark data can be found at http://www.ehp.qld.gov.au/ecosystems/biodiversity/biocondition_benchmarks.html or
- b) if benchmark data are not available, the regional ecosystem description in REDD.

Remnant vegetation—for an area of Queensland:

1. within a regional ecosystem map, the vegetation mapped as being within remnant endangered regional ecosystems, remnant of concern regional ecosystems and remnant not of concern regional ecosystems shown on the map;
2. within a remnant map, the vegetation mapped as remnant vegetation on the map; or
3. for which there is no regional ecosystem map or remnant map, the vegetation, part of which forms the predominant canopy of the vegetation—
 - (a) covering more than 50% of the undisturbed predominant canopy;
 - (b) averaging more than 70% of the vegetation’s undisturbed height; and
 - (c) composed of species characteristic of the vegetation’s undisturbed predominant canopy.

Rills—any discontinuous erosion channel up to 30 cm deep or wide.

Severe soil erosion—one or more of the following:

- a) rills numerous, overland flow, corrugated ground surface
- b) runoff concentrated into well developed channels 15–30 cm deep
- c) terracettes >5 cm
- d) gullies >15% of site, >3 m deep, branching away from drainage lines or multiple branches within drainage lines, devoid of vegetation
- e) substantial deposits of soil down slope.

Shrub—a woody plant multi-stemmed at the base (or within 200 mm from ground level) or, if single-stemmed, less than 2 m tall.

Site—a 100m x 100m assessment area, identified by the ‘initial’ site coordinates or the ‘centre’ site coordinates.

Sparse—pasture plants are clearly separated.

Stratum—one of the spatial categories to which each part of a lease is assigned. The strata used in these guidelines are:

- a) mechanically disturbed
- b) alluvial land types
- c) land types (not mechanically disturbed or alluvial)
- d) undesignated
- e) inaccessible.

Subregion that has greater than 65% remnant vegetation is any of the following:

- a) any subregion within any of the following bioregions: Cape York Peninsula, Channel Country, Einasleigh Uplands, Gulf Plains, Mitchell Grass Downs, and Northwest Highlands
- b) the following subregions in the Mulga Lands bioregion: Nebine Plains, Warrego Plains, Cuttaburra — Paroo, West Warrego, Northern Uplands, West Bulloo, Urisino Sandplains
- c) the following subregions in the Wet Tropics bioregion: Paluma — Seaview, Kirrama — Hinchinbrook, Bellenden Ker — Lamb, Macalister, Daintree - Bloomfield
- d) the following subregions in the Central Queensland Coast bioregion: Whitsunday, Clarke — Connors Ranges, Byfield, Manifold, Debella
- e) the following subregions in the Desert Uplands bioregion: Praire — Torrens Creeks Alluvials, Alice Tableland, Cape — Campaspe Plains
- f) the following subregions in the Brigalow Belt bioregion: Townsville Plains, Bogie River Hills, Cape River Hills, Beucazon Hills, Wyarra Hills, Anakie Inlier, Woorabinda, Buckland Basalts, Carnarvon Ranges
- g) the following subregions in Southeast Queensland bioregion: Great Sandy, Southern Great Barrier Reef.

Successfully regenerating—plants are greater than 0.5 metres high.

Terracettes—an erosion step caused by sheet erosion.

Tree— woody plant more than 2 m tall, usually with a single stem, or branches well above the base; not always distinguishable from large shrubs.

Tree basal area—the cross-sectional area (over the bark) at breast height (1.3 m above the ground) measured in square metres (m²).

TSDM (Total Standing Dry Matter)—total standing dry matter ground layer yield.

Very sparse—pasture plants are well separated.

Watering point—a creek, stream, bore, bore drain, dam, permanent waterhole, trough, spring, wetland, lake.

Waterlogging—soaking or saturated with water.

Weighting—the level of influence an indicator has on an attribute.

Within sight—that a declared pest plant or animal is observed by the assessor(s) when the assessor(s) is standing within the relevant site.

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