

Delbessie Agreement

(State Rural Leasehold Land Strategy)

Guidelines for determining lease land condition

Version 1.1
October 2009

Prepared by:

State Land Asset Management
Department of Environment and Resource Management

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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 Environment and Resource Management, and Queensland Primary Industries and Fisheries.

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*.

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 Delbessie Agreement¹ 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 Delbessie Agreement 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 agreement focuses on land leased for agricultural, grazing or pastoral purposes for a term of 20 years or more, and covering no less than 100 hectares. Approximately 1788 rural leases are affected, covering 86.6 million hectares or half of Queensland. Approximately 96.3 per cent of the rural leasehold land to which the Delbessie Agreement 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 Delbessie Agreement.

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 Delbessie Agreement.

These guidelines may be reviewed at the discretion of the Minister for Natural Resources, Mines and Energy and Minister for Trade 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 lease land condition* (the guidelines) will be used by the Department of Environment and Resource Management (DERM) 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, 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 Delbessie Agreement does not apply (e.g. leases less than 100 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, 155A, 155B, 155D, 159, 160A, 162A 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 100 hectares or more.

¹ The *State Rural Leasehold Land Strategy*, which is now known as the Delbessie Agreement, was signed in December 2007 by the Queensland Government, AgForce Queensland and the Australian Rainforest Conservation Society. Implementation of the agreement is a key initiative under the Blueprint for the Bush, a 10-year plan to support growth and development in rural and remote Queensland. The Delbessie Agreement can be downloaded at <www.derm.qld.gov.au>.

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 Delbessie Agreement, 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 inspection 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 inspection. The purpose of the field inspection 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 inspection.

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 the Environmental Protection Agency’s BioCondition methodology³.

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.

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.)

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.

² Kutt and Fisher 2007

³ BioCondition: a terrestrial vegetation condition assessment tool for biodiversity in Queensland: field assessment manual Version 1.6

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	✓	✓
Habitat and function – tree layer	X	✓
Habitat and function – shrub layer	✓	✓
Habitat and function – ground layer	X	✓
Canopy species recruitment	X	✓
Canopy health	X	✓
Landscape context	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 DERM 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

Digital data layers should be compiled, including:

- 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 must be inspected 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 inspection
- ascertain DERM's advice about the lease land.

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

2.3 Lease land stratification

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'.

To map land types, use the look-up tables developed by DERM 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 5 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 20 per cent of the lease land, progressively reduce the cut-off percentage of the too small stratum from 5 per cent by 0.1 per cent each time until the too small stratum makes up less than 20 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.

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 that are currently open.
2. To achieve the sampling of five riparian sites across the lease land, it may be necessary to 'target' riparian sites by overlaying and intersecting open access tracks, the statewide 1:250000 drainage line dataset, recent satellite imagery, and the alluvial stratum, to determine accessible riparian areas. Allocate at least five riparian sites across the lease land, upstream of access tracks (if the track crosses the drainage line), on the drainage line and 250 metres from an access track.
3. Using the SiteGen tool, buffer all open access tracks with a 250 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 5 per cent of the total lease land it does not have to be assessed unless the stratum is an alluvial land type.
 - (c) If the lease land is greater than 5000 hectares, each stratum must have at least five sites, unless the stratum is an alluvial land type that has limited access or comprises less than 5 per cent of the lease land area. If the alluvial land type comprises less than 5 per cent of the lease land area, one site should be allocated to the land type for each percentage point of the area of the lease land that the alluvial land type comprises.
 - (d) If the lease land is 5000 hectares or less, each stratum must have at least 3 sites, unless the stratum is an alluvial land type comprising less than 5 per cent of the lease land area. In this case, the alluvial land type must be allocated one site.
 - (e) Further, a site is considered unsuitable to rate (but will still be inspected 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 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.
 - (f) Where the number of required sites for the lease land is greater than the amount required per stratum for the lease, the extra sites must be allocated to the accessible strata in proportion to their area.
5. Any inaccessible stratum will not be assessed, so sites are not required in these areas.
6. 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 inspection, the site will be inspected 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 in Table 2 (due to mixed polygons and parts of the polygon being distant from access), the minimum number of sites may be reduced.

7. 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 5 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 detailed sites assessed per lease (supported by further observations)
<1000	5 or 3 per stratum (except alluvial land types), whichever is greater
1000–3000	10 or 3 per stratum (except alluvial land types), whichever is greater
3001–5000	15 or 3 per stratum (except alluvial land types), whichever is greater
5001–20 000	20 or 5 per stratum (except alluvial land types), whichever is greater
20 001–50 000	30 or 5 per stratum (except alluvial land types), whichever is greater
>50 000	40 or 5 per stratum (except alluvial land types), whichever is greater

2.5 Contextual data analysis

The following datasets are the minimum of the contextual data that must 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.

2.6 Field inspection preparation

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

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

Print out maps of the lease land for use during the site inspection, showing:

- assessment sites, other areas of interest (e.g. areas of possible land degradation)
- areas identified by DERM 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 inspection

3.1 Process

The field inspection involves:

1. Visiting areas of interest that were identified during the desktop analysis or the lease referral process, for:

- (i) s.176V of the Land Act *Purposes of a land management agreement*
- (ii) s.159 of the Land Act *Provisions for deciding an 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 inspected 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 and record the location (using a GPS), extent and/or condition, where appropriate, of the following:

- declared pests
- salinity
- soil erosion
- scalding
- native fauna species
- thickening of regional ecosystems
- stream bank instability or slumping
- open bore drains or uncapped bores
- infrastructure that was not identified during the desktop assessment
- 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.

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 inspection has been completed, these ratings are used to derive 'scores'. Attribute scores are calculated for the inspection site, each stratum and the lease. Attribute scores will be calculated for each of the seven attributes; however, the lease attribute scores for pasture, soil and biodiversity 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 consistent across sites, with one exception. The weighting of the indicator 'ground cover' changes from 4 to 5 on sites that have a slope of more than 3 per cent.

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 Kepner-Tregoe Decision Making © methodology

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).
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 inspection site 400 metres beyond the transition zone, unless the target land type is a narrow alluvial land type. If the target stratum is an alluvial land type that is narrow, move the site so that it contains the alluvial land type.
4. If the area has been very recently burnt and has not yet responded, or exposed bedrock exists across >50 per cent of the site, move the inspection 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 five riparian sites (either targeted or paired) 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. 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.
11. Determine if the site includes a riparian area. If the site includes a riparian area, a paired site is necessary to assess the riparian area and the non-riparian area (the land type in the surrounding area). Record the upstream location where the riparian area intersects the site. This point locates the riparian assessment site which extends 100 metres upstream and the width of the riparian vegetation to a maximum width of 100 metres. At riparian sites, assess the indicators in section 6, using the most appropriate alluvial land type sheet for the site.
12. For the non-riparian site, move the location of the original site so that it is outside the riparian area and wholly within one land type. Assess the indicators set out in section 5 and follow steps 13 to 22 below.
13. Sight a bearing in a north–south or east–west direction. Extend the tape or pace to the 50 metre mark (the centre point of the assessment site). The coordinate of this centre point becomes the centre point of the site and now identifies the assessment site. Record the coordinate/location of the centre point (refer to Figure 1).
14. 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, and an estimate of total ground cover is to be recorded.

If the ground cover height is low, transects can be assessed using the step point methodology. However, if the site ground cover height is tall, transects must be assessed using a tape and line intercept methodology, unless ground cover is less than 15 per cent or greater than 70 per cent.

15. For the step point methodology, 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).
16. For the line intercept method, extend the tape measure along the transect, keeping the line as straight as possible. Record at each metre mark, the ground cover component beneath the tape (the ground cover components are listed in step 15 above).
17. Where tree basal area (TBA) is homogenous across the site, measure the TBA (using a Bitterlich or similar gauge and an appropriate basal area factor (BAF)) at the centre point of the site. Where trees or shrubs are influencing pasture growth and/or TBA is heterogeneous across the site, measure TBA at an additional four locations—25 metres north, south, east and west from the centre of the site.
18. Calculate an average tree basal area measurement for the site.
19. From observations made across the site, complete the field observations on a PDA or on a copy of the field observation sheet that is provided in Appendix E. Observations of the site that must be recorded include:
 - (a) three to five (where they exist) dominant pasture species
 - (b) the three (where they exist) dominant shrub species
 - (c) the three (where they exist) dominant over-storey species
 - (d) any declared pests
 - (e) any encroaching species
 - (f) any Indigenous or non-Indigenous cultural heritage features.

If the site differs from the surrounding area (such as being dominated by a scald), make a note of this in the 'comments' section.
20. On the north–south transect, take photos #1 and #2 facing south towards, and focused on, the central point at 50 centimetres above ground level (knee height) from a distance of 20 metres, and 10 metres from the central point respectively (refer to Figure 2).
21. Take photos #3 to #6 facing north, east, south and west (in that order) from the central point (50 metre mark on the tape), focused on the horizon at a height of 150 cm (shoulder height).
22. Rate each indicator (listed either in section 5, 6 or 7) from observations made across the site.

Figure 1. Assessment site layout

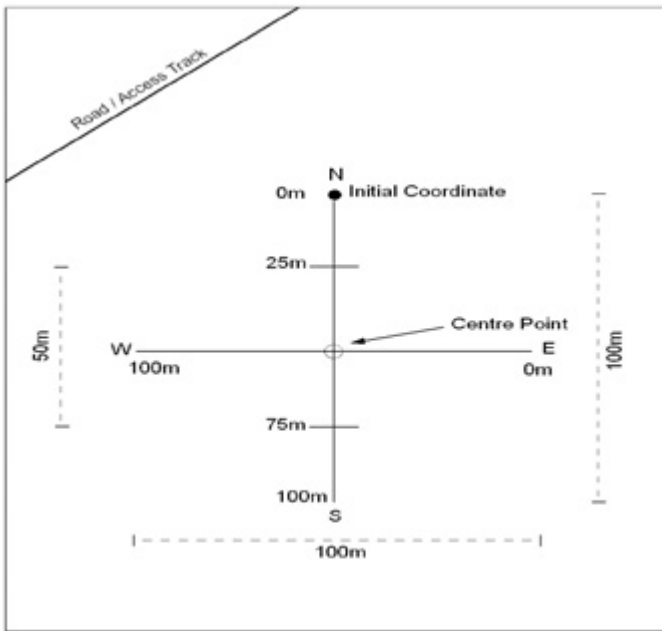
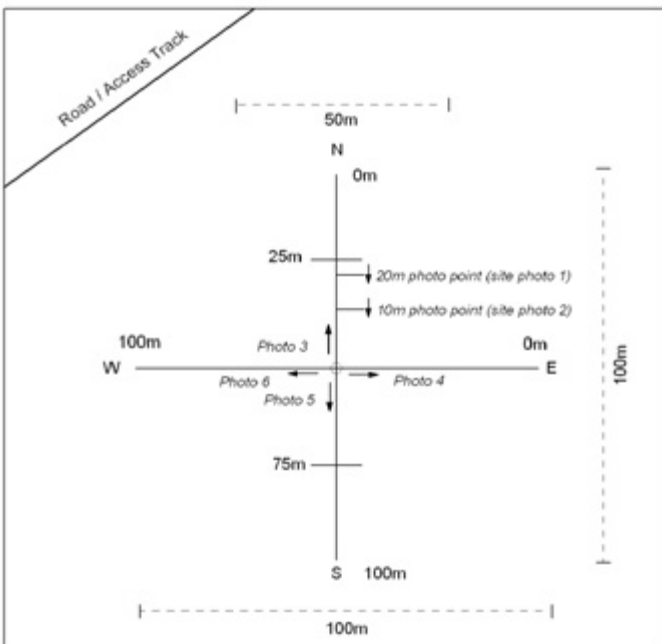


Figure 2. Taking photographs at the assessment site



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
	Habitat and function – tree layer	5.13
	Habitat and function – shrub layer	5.14
	Habitat and function – ground layer	5.15
	Canopy species recruitment	5.16
	Canopy health	5.17
	Landscape context	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 is 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) an annually dominated land type; b) the 'hard gibber and ironstone country' land type; or c) a regional ecosystem where thinning cannot occur and tree basal area is >20 m ² /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) 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) an annually dominated land type; 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	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 is 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	Established preferred species are >80% or the site is located within: <ol style="list-style-type: none"> an annually dominated land type; the 'hard gibber and ironstone country' land type; or a regional ecosystem where thinning cannot occur and tree basal area is >20 m²/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). 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	Established preferred species are >80% or the site is located within: <ol style="list-style-type: none"> an annually dominated land type; the 'hard gibber and ironstone country' land type; or a regional ecosystem where thinning cannot occur and tree basal area is >20 m²/ha.
1	The site is within an: <ol style="list-style-type: none"> expected high density land type and established intermediate and preferred species are closed and evenly distributed; or expected moderate density land type and established intermediate and preferred species are open and evenly distributed; or expected low density land type and established intermediate and preferred species are sparse and evenly distributed.
2	The site is within an: <ol style="list-style-type: none"> expected high density land type and established intermediate and preferred species are: <ul style="list-style-type: none"> – open and evenly distributed; or – partly closed and unevenly distributed; or expected moderate density land type and established intermediate and preferred species are: <ul style="list-style-type: none"> – sparse and evenly distributed; or – partly open and unevenly distributed; or expected low density land type and established intermediate and preferred 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> <p>a) expected high density land type and established intermediate and preferred species are:</p> <ul style="list-style-type: none"> – sparse and evenly distributed; or – partly open and unevenly distributed; or <p>b) expected moderate density land type and established intermediate and preferred species are:</p> <ul style="list-style-type: none"> – very sparse and evenly distributed; or – partly sparse and unevenly distributed; or <p>c) expected low density land type and established intermediate and preferred species are:</p> <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> <p>a) expected high density land type and established intermediate and preferred species are:</p> <ul style="list-style-type: none"> – very sparse and evenly distributed; or – partly sparse and unevenly distributed; or – absent; or <p>b) expected moderate density land type and established intermediate and preferred species are:</p> <ul style="list-style-type: none"> – isolated and evenly distributed; or – partly very sparse and unevenly distributed; – absent; or <p>c) expected low density land type and established intermediate and preferred species are:</p> <ul style="list-style-type: none"> – 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 is 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	<p>The site is located within:</p> <p>a) an annually dominated land type;</p> <p>b) the ‘hard gibber and ironstone country’ land type; or</p> <p>c) a regional ecosystem where thinning cannot occur and tree basal area is >20 m²/ha.</p>
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 or 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). 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	<p>The site is within an:</p> <p>a) expected high density land type and established non-preferred species are:</p> <ul style="list-style-type: none"> – open and evenly distributed; or – partly closed and unevenly distributed; or <p>b) expected moderate density land type and established non-preferred species are:</p> <ul style="list-style-type: none"> – sparse and evenly distributed; or – partly open and unevenly distributed; or <p>c) expected low density land type and established non-preferred species are:</p> <ul style="list-style-type: none"> – very sparse and evenly distributed; or – partly sparse and unevenly distributed.
4	<p>The site is within an:</p> <p>a) expected high density land type and established non-preferred and species are closed and evenly distributed; or</p> <p>b) expected moderate density land type and established non-preferred species are open and evenly distributed; or</p> <p>c) expected low density land type and established non-preferred species are sparse and evenly distributed.</p>

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	<p>Site has minor soil erosion or soil disturbance, evident by one or more of the following:</p> <ul style="list-style-type: none"> – soil surface compaction or soil crusting – minor soil deposition – signs of increased run off or overland flow – pedestals 1–2 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 (1–5%) of the site.
3	<p>Site has moderate soil erosion, evident by one or more of the following:</p> <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.

Rating	Description
4	<p>Site has severe soil erosion, evident by one or more of the following:</p> <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 total ground cover of the site?

Refer to the glossary for definitions of: ground cover.

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 salinity.

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 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

5.11 Indicator 11—Proportion of native ground layer species

Q. What proportion of the ground layer is 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: <ul style="list-style-type: none"> a) an annually dominated 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 d) an area where >25% of the ground layer is comprised of invasive exotic pasture species.
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, 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	The site is located within: <ul style="list-style-type: none"> a) an annually dominated 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 d) an area where >25% of the ground layer is comprised of invasive exotic pasture species.
1	The site is within an: <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.

Rating	Description
2	<p>The site is within an:</p> <p>a) expected high density land type and established native preferred and established native intermediate species are:</p> <ul style="list-style-type: none"> – open and evenly distributed; or – partly closed and unevenly distributed; or <p>b) expected moderate density land type and established native preferred and established native intermediate species are:</p> <ul style="list-style-type: none"> – sparse and evenly distributed; or – partly open and unevenly distributed; or <p>c) expected low density land type and established native preferred and established native intermediate species are:</p> <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> <p>a) expected high density land type and established native preferred and established native intermediate species are:</p> <ul style="list-style-type: none"> – sparse and evenly distributed; or – partly open and unevenly distributed; or <p>b) expected moderate density land type and established native preferred and established native intermediate species are:</p> <ul style="list-style-type: none"> – very sparse and evenly distributed; or – partly sparse and unevenly distributed; or <p>c) expected low density land type and established native preferred and established native intermediate species are:</p> <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> <p>a) expected high density land type and established native preferred and established native intermediate species are:</p> <ul style="list-style-type: none"> – very sparse and evenly distributed; or – partly sparse and unevenly distributed; or – absent; or <p>b) expected moderate density land type and established native preferred and established native intermediate species are:</p> <ul style="list-style-type: none"> – isolated and evenly distributed; or – partly very sparse and unevenly distributed; or – absent; or <p>c) expected low density land type and established native preferred and established native intermediate species are:</p> <ul style="list-style-type: none"> – absent; or – partly isolated and unevenly distributed.

5.13 Indicator 13—Habitat and function – tree layer

Q. What proportion of the trees is large and mature?

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

Table 17. Habitat and function—tree layer

Rating	Description
0	The site is: a) within a grassland regional ecosystem and no trees are present; or b) the site has previously been cleared of native vegetation, and the clearing was consistent with Government policy at the time of the development
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, relative to the regional ecosystem

5.14 Indicator 14—Habitat and function – shrub layer

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

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

Table 18. Habitat and function—shrub layer

Rating	Description
0	The site is: a) within a grassland regional ecosystem and no shrubs are present; or b) the site has previously been cleared of native vegetation, and the clearing was consistent with Government policy at the time of the development
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 shrubs are not excessively dense or sparse
4	Native shrub density/cover is not within the expected range, relative to the regional ecosystem, as shrubs are either excessively dense or absent

5.15 Indicator 15—Habitat and function – ground layer

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. Habitat and function—ground layer

Rating	Description
0	The site is: a) within a grassland regional ecosystem and no trees or shrubs are present; or b) the site has previously been cleared of native vegetation, and the clearing was consistent with Government policy at the time of the development.
1	Frequent presence of logs, woody and leaf litter, relative to the regional ecosystem
2	Moderate presence of logs, woody and leaf litter, relative to the regional ecosystem
3	Occasional presence of logs, woody and leaf litter, relative to the regional ecosystem
4	Absence of logs, woody and leaf litter, relative to the regional ecosystem

5.16 Indicator 16—Canopy species recruitment

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

Do not include declared pest plants.

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

Table 20. Canopy species recruitment

Rating	Description
0	The site is: a) within a grassland regional ecosystem and no trees are present; or b) the site has previously been cleared of native vegetation, and the clearing was consistent with Government policy at the time of the development
1	Strong evidence (75%) of canopy species (excluding declared species) successfully regenerating across the site
2	Some evidence (20–75%) of canopy species (excluding declared species) successfully regenerating across the site
3	Little evidence (<20%) of canopy species (excluding declared species) successfully regenerating across the site
4	No evidence of canopy species (excluding declared species) successfully regenerating across the site

5.17 Indicator 17—Canopy health

Q. Are the canopies of over-storey trees alive or dead?

Do not include declared pest plants. (See Figure 3 ‘Canopy health’, overleaf.)

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

Table 21. Canopy health

Rating	Description
0	The site is: a) within a grassland regional ecosystem and no trees are present; or b) the site has previously been cleared of native vegetation, and the clearing was consistent with Government policy at the time of the development
1	<10% of trees show evidence of canopy health category 3 or higher
2	10 to 30% of trees show evidence of canopy health category 3 or higher
3	30 to 70% of trees show evidence of canopy health category 3 or higher
4	>70% of trees show evidence of canopy health category 3 or higher

5.18 Indicator 18—Landscape context

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

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

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

Table 22. Landscape context

Rating	Description
0	The site: a) has previously been cleared of native vegetation, and the clearing was consistent with Government policy at the time of the development
1	The site is located within a patch of remnant vegetation >100 hectares
2	The site is located within a patch of remnant vegetation 30–100 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

5.19 Indicator 19—Declared pest plants

Q. How many declared pest plants are there on or within sight of 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 grass species and four stems of a succulent species, the rating for the site is 4. 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 three would be assigned.)

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

This indicator will not contribute to the site score for biodiversity if the site has previously been cleared of native vegetation, and the development was consistent with Government policy at the time the clearing or development took place.

Table 23. 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 no more than 6 stems of a declared succulent species.
4	Within the site either: a) declared pest plants comprise >30% of canopy cover; or b) there are more than 6 stems of a declared succulent species.

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?

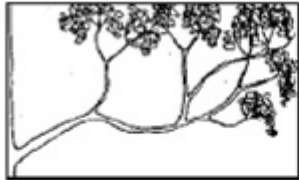




Refer to the glossary for definitions of: declared.

This indicator will not contribute to the site score for biodiversity if the site has previously been cleared of native vegetation, and the development was consistent with Government policy at the time the clearing or development took place.

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

Figure 3. Canopy health

<p>Category 1 (Nil)</p>		<p>Normal healthy crowns Very few dead or leafless branches, no obvious sucker (epicormic) growth</p>
<p>Category 2 (Minor)</p>		<p>Slight dieback in crowns Most of crown healthy, some death of minor branches, some epicormic growth obvious</p>
<p>Category 3 (Moderate)</p>		<p>Moderate dieback in crowns Approximately half of crown with death in both minor and major branches, remaining crown with high proportion of epicormic growth.</p>
<p>Category 4 (Severe)</p>		<p>Severe dieback in crowns Most branches dead or leafless, crown comprised mainly of epicormic regrowth on branches or stem</p>
<p>Category 5 (Dead)</p>		<p>Dead (does not include trees killed through treatment or damaged during clearing)</p>

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
	Habitat and function—tree layer	6.3
	Habitat and function—shrub layer	6.4
	Habitat and function—ground layer	6.5
	Recruitment	6.6
	Canopy health	6.7
	Landscape context	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
	Habitat and function—tree layer	6.3
	Habitat and function—shrub layer	6.4
	Habitat and function—ground layer	6.5
	Canopy species recruitment	6.6
	Canopy health	6.7
	Landscape context	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 is 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: <ol style="list-style-type: none"> an annually dominated land type; the 'hard gibber and ironstone country' land type; a regional ecosystem where thinning cannot occur and tree basal area is >20 m²/ha; or an area where >25% of the ground layer is comprised of invasive exotic pasture species.
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 definition), 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: <ol style="list-style-type: none"> an annually dominated land type; the 'hard gibber and ironstone country' land type; a regional ecosystem where thinning cannot occur and tree basal area is >20 m²/ha; or an area where >25% of the ground layer is comprised of invasive exotic pasture species.
1	The site is within an: <ol style="list-style-type: none"> expected high density land type and established native preferred and established native intermediate species are closed and evenly distributed; or expected moderate density land type and established native preferred and established native intermediate species are open and evenly distributed; or 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> <p>a) expected high density land type and established native preferred and established native intermediate species are:</p> <ul style="list-style-type: none"> – open and evenly distributed; or – partly closed and unevenly distributed; or <p>b) expected moderate density land type and established native preferred and established native intermediate species are:</p> <ul style="list-style-type: none"> – sparse and evenly distributed; or – partly open and unevenly distributed; or <p>c) expected low density land type and established native preferred and established native intermediate species are:</p> <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> <p>a) expected high density land type and established native preferred and established native intermediate species are:</p> <ul style="list-style-type: none"> – sparse and evenly distributed; or – partly open and unevenly distributed; or <p>b) expected moderate density land type and established native preferred and established native intermediate species are:</p> <ul style="list-style-type: none"> – very sparse and evenly distributed; or – partly sparse and unevenly distributed; or <p>c) expected low density land type and established native preferred and established native intermediate species are:</p> <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> <p>a) expected high density land type and established native preferred and established native intermediate species are:</p> <ul style="list-style-type: none"> – very sparse and evenly distributed; or – partly sparse and unevenly distributed; or – absent; or <p>b) expected moderate density land type and established native preferred and established native intermediate species are:</p> <ul style="list-style-type: none"> – isolated and evenly distributed; or – partly very sparse and unevenly distributed; or – absent; or <p>c) expected low density land type and established native preferred and established native intermediate species are:</p> <ul style="list-style-type: none"> – absent; or – partly isolated and unevenly distributed.

6.3 Indicator 23—Habitat and function – tree layer

Q. What proportion of the trees is large and mature?

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

Table 28. Habitat and function—tree layer

Rating	Description
0	The site is: a) within a grassland regional ecosystem and no trees are present; or b) the site has previously been cleared of native vegetation, and the clearing was consistent with Government policy at the time of the development
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, relative to the regional ecosystem

6.4 Indicator 24—Habitat and function – shrub layer

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

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

Table 29. Habitat and function—shrub layer

Rating	Description
0	The site is: a) within a grassland regional ecosystem and no shrubs are present; or b) the site has previously been cleared of native vegetation, and the clearing was consistent with Government policy at the time of the development
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 shrubs are not excessively dense or sparse
4	Native shrub density/cover is not within the expected range, relative to the regional ecosystem, as shrubs are either excessively dense or absent

6.5 Indicator 25—Habitat and function – ground layer

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. Habitat and function—ground layer

Rating	Description
0	The site is: a) within a grassland regional ecosystem and no trees or shrubs are present; or b) the site has previously been cleared of native vegetation, and the clearing was consistent with government policy at the time of the development
1	Frequent presence of logs, woody and leaf litter, relative to the regional ecosystem
2	Moderate presence of logs, woody and leaf litter, relative to the regional ecosystem
3	Occasional presence of logs, woody and leaf litter, relative to the regional ecosystem
4	Absence of logs, woody and leaf litter, relative to the regional ecosystem

6.6 Indicator 26—Canopy species recruitment

Q. What proportion of the canopy species is regenerating across the site?

Do not include declared pest plants

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

Table 31. Canopy species recruitment

Rating	Description
0	The site is: a) within a grassland regional ecosystem and no trees are present; or b) the site has previously been cleared of native vegetation, and the clearing was consistent with Government policy at the time of the development
1	Strong evidence (75%) of canopy species (excluding declared species) successfully regenerating across the site
2	Some evidence (20–75%) of canopy species (excluding declared species) successfully regenerating across the site
3	Little evidence (<20%) of canopy species (excluding declared species) successfully regenerating across the site
4	No evidence of canopy species (excluding declared species) successfully regenerating across the site

6.7 Indicator 27—Canopy health

Q. Are the canopies of over-storey trees alive or dead?

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. Canopy health

Rating	Description
0	The site is: a) within a grassland regional ecosystem and no trees are present; or b) the site has previously been cleared of native vegetation, and the clearing was consistent with Government policy at the time of the development
1	<10% of trees show evidence of canopy health category 3 or higher
2	10 to 30% of trees show evidence of canopy health category 3 or higher
3	31 to 70% of trees show evidence of canopy health category 3 or higher
4	>70% of trees show evidence of canopy health category 3 or higher

6.8 Indicator 28—Landscape context

Q. Is the site located in a remnant regional ecosystem? What is the size of the patch of the remnant regional ecosystem?

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

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

Table 33. Landscape context

Rating	Description
0	The site: a) has previously been cleared of native vegetation, and the clearing was consistent with Government policy at the time of the development
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 30–100 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 or within sight of 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 grass species and four stems of a succulent species, the rating for the site is 4. 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; within sight; declared.

This indicator will not contribute to the site score for biodiversity if the site has previously been cleared of native vegetation, and the development was consistent with Government policy at the time the clearing or development took place.

Table 34. 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 no more than 6 stems of a declared succulent species.
4	Within the site either: a) declared pest plants comprise >30% of canopy cover; or b) there are more than 6 stems of a declared succulent species.

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.

This indicator will not contribute to the site score for biodiversity if the site has previously been cleared of native vegetation, and the development was consistent with Government policy at the time the clearing or development took place.

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 and vehicular access in the riparian area
3	Area heavily disturbed by livestock tracks, pads and vehicular access and evidence of livestock camps in the riparian area
4	Livestock tracks and pads and vehicular access causing severe soil erosion in the riparian area

6.12 Indicator 32—Ground cover

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

Refer to the glossary for definitions of: ground cover.

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 salinity.

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 or within sight of 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, 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 no more than 6 stems of a declared succulent species.
4	Within the site either: a) declared pest plants comprise >30% of canopy cover; or b) there are more than 6 stems of a declared succulent species.

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 lease 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. Each of the attributes: pasture, soil and 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 salinity, natural water resources, riparian vegetation and declared pests) will be reported on and will inform the land management agreement.

The calibrated threshold for all attributes is 70. However, where the key attributes (soil, pasture or biodiversity) in total fall within 5 points of the threshold, further information will be taken into consideration.

8.1 Calculate an attribute score for a site

1. Refer to the field assessment results, particularly the ratings obtained for each indicator at each site.
2. Refer to the tables 4, 25 and 40, for the indicators of each attribute for each stratum. Refer to table in Appendix D for indicator weightings for each attribute.
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 attribute score for a stratum

1. For each attribute, add the attribute scores for each inspection site in the stratum.
2. Divide the total by the number of inspection sites in the stratum.

8.3 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.

8.4 Determination of condition

The lease attribute scores for pasture, soil and biodiversity are the key inputs to determine if a lease is in good condition. The following sets out the procedure for determining whether the lease land is in good condition:

1. If all three attributes pasture, soil and biodiversity score 70 or more, the lease is determined to be in 'good condition'.
2. If one or more of the pasture, soil or biodiversity attributes scores less than 70, and if the total for those attributes of the differences between 70 and the individual attribute scores is 5 points or less, the lease condition must be reviewed by Senior Natural Resource Management Officer (State Rural Leasehold Land) who did not attend the field inspection. The Senior Natural Resource Management Officer (State Rural Leasehold Land) must follow step 4 below.
3. If one or more of the pasture, soil or biodiversity attributes scores less than 70, and if the total for those attributes of the differences between 70 and the individual attribute scores is more than 5 points, the lease land is determined to be not in 'good condition'.

4. The Senior Natural Resource Management Officer (State Rural Leasehold Land) must review whether the lease land is in 'good condition' taking into consideration:
 - all information collected as part of the assessment process (photographs, site data, area of interest, the Ground Cover Index, AussieGRASS); and
 - any other information relevant to the lease land.

The Senior Natural Resource Management Officer (State Rural Leasehold Land) will make a recommendation to the Minister about whether the lease is in good condition.

Part 5

Supplementary tables

Table S–1. Alluvial land types

GLM region	Land type
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
Mackay Whitsunday	Alluvial flats and plains
Maranoa Balonne	Coolibah flood plains
	Poplar box on alluvial plains
Mitchell Grass Downs	Flooded Mitchell grasslands
	Floodplains
	Open alluvia
	Wooded alluvia
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
Burdekin Dry Tropics	Black basalt
	Brown basalt
	Clayey alluvials
	Downs
	Goldfields country – black soils
	Goldfields country – red soils
	Loamy alluvials
	Narrow-leaved ironbark on deeper 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 country
	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
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 forest on duplexes and loams
	Silver-leaved ironbark on clay

Region	Land type
Mackay Whitsunday	Alluvial flats and plains
	Coastal eucalypt forests and woodlands
	Poplar gum woodlands
Maranoa Balonne	Coolibah flood plains
	Mitchell grasslands
	Poplar box on alluvial plains
Mitchell grass downs	Boree wooded downs
	Flooded Mitchell grasslands
	Open alluvia
	Open downs
	Wooded alluvia
	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 duplexes and loams
	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
	Red basalt
	Red duplex
Southern gulf	Bluegrass browntop plains
	Coastal country
	Frontage
	Marine plains
	Mitchell grass
Wet Tropics	Alluvial
	Black soils and black and basalts
	Range soil
	Red basalt
	Red soils
	Sandy red earths
	Yellow earths

Table S–3. Expected moderate pasture density land types

Region	Land type
Burdekin Dry Tropics	Blackwood scrubs on structured clays
	Box and napunyah
	Box country
	Brigalow/gidgee scrubs
	Narrow-leaved ironbark on shallow soils
	Silver-leaved ironbark
	Yellowjack with other eucalypts
Channel country	Frontage / alluvial country
	Gidyea woodlands
	Open downs
	Poorly drained swamps & depressions
	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 with softwood scrub species
	Bullock 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 melonhole
	Narrow-leaved ironbark and wattles
	Narrow-leaved ironbark on granite
	Silver-leaved ironbark on granite
	Spotted gum ridges
	Tall open forest on snuffy soils
Mackay Whitsunday	Coastal tea tree plains
	Coastal wetlands
	Eucalypt hills and ranges
	Marine plains and tidal flats
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	Ashy downs
	Floodplains
	Pebbly downs
	Soft gidyea
	Soft mulga
	Soft mulga sandridge
	Spinifex sandplains
Moreton	Ironbarks and spotted gum ridges
	Ironbarks on granite
Mulga	Brigalow
	Gidyae
	Mulga sandplains
	Open alluvial plains
	Poplar box woodlands (red soils)
	Soft mulga
Northern gulf	Georgetown granites
	Marine Plains
	Old alluvials
	Range soil
	Red earths
	Sand ridge
	Sandy forest
	Yellow earths

Region	Land type
Southern gulf	Basalt
	Gidyea country
	Hughenden rough country
	Ironbark
	Open red country
	Sandy forest country
	Silverleaf box on open red country
	Silverleaf box with perennial species
	Silverleaf box with spinifex
	Spinifex plains
Wet Tropics	White sandy soils

Table S-4. Expected low pasture density land types

Region	Land type
Burdekin Dry Tropics	Blackwood scrubs on massive soils
	Lancewood / bendee / rosewood
	Softwood scrub
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	
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
Mackay Whitsunday	Coastal rainforests
	Wet highland rainforests
Maranoa Balonne	Bendee ridges
	Cypress pine on deep sands
	Hard mulga
	Softwood vine scrub on clay or loam
Mitchell grass downs	Hard gidyea
	Hard mulga
	Jump-ups
Moreton	Brigalow softwood scrub
	Rainforest (closed forest) on basalts
	Softwood vine scrub

Region	Land type
Mulga	Dissected residuals (jump-ups)
	Hard mulga
Northern gulf	Lancewood
Southern gulf	Lancewood
	Rough spinifex hills

Table S–5: Subregions with greater than 60 per cent remnant vegetation

Bioregion	Subregion
Brigalow Belt	Anakie Inlier
	Beucazon Hills
	Bogie River Hills
	Buckland Basalts
	Cape River Hills
	Carnarvon Ranges
	Nebo—Connors Ranges
	Northern Bowen Basin
	Townsville Plains
	Woorabinda
	Wyarra Hills
Cape York Peninsula	Battle Camp Sandstones
	Cape York—Torres Strait
	Coastal Plains
	Jardine—Pascoe Sandstones
	Laura Lowlands
	(Northern) Holroyd Plain
	Starke Coastal Lowlands
	Weipa Plateau
Central Queensland Coast	Byfield
	Clarke—Connors Ranges
	Debella
	Manifold
	Whitsunday
Channel Country	Cooper Plains
	Diamantina Plains
	Goneaway Tablelands
	Noccundra Slopes
	Simpson-Strzelecki Dunefields
	Toko Plains
Desert Uplands	Alice Tableland
	Cape-Campaspe Plains
	Jericho
	Prairie—Torrens Creeks Alluvials
Einasleigh Uplands	Broken River
	Georgetown—Croydon
	Herberton—Wairuna
	Hodgkinson Basin
	Kidston
	Undara—Toomba Basalts

Gulf Plains	Armraynald Plains
	Claraville Plains
	Donors Plateau
	Doomadgee Plains
	Gilberton Plateau
	Holroyd Plain—Red Plateau
	Karumba Plains
	Mitchell—Gilbert Fans
	Wellesley Islands
	Woondoola Plains
Mitchell Grass Downs	Barkly Tableland
	Central Downs
	Georgina Limestone
	Kynuna Plateau
	Northern Downs
	Southern Wooded Downs
	Southwestern Downs
Mulga Lands	Langlo Plains
	Nebine Plains
	Northern Uplands
	Paroo Sand Sheets
	Warrego River Plains
	West Bulloo
	West Warrego
Northwest Highlands	McArthur—South Nicholson Basins
	Mount Isa Inlier
	Southwestern Plateaus & Floodouts
	Thorntonia
Southeast Queensland	Burnett—Curtis Hills and Ranges
	Great Sandy
	Scenic Rim
Wet Tropics	Bellenden Ker—Lamb
	Daintree—Bloomfield
	Kirrama—Hinchinbrook
	Macalister
	Paluma—Seaview

Table S–6. Species that indicate 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
 - (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 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 Minister considers the lease land is in good condition; and
 - (b) 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; and
 - (c) if the Minister considers that it is appropriate for there to be an indigenous access and use agreement relating to the lease land—an indigenous access and use agreement relating to the land has been entered into.
- (6) In addition, a term lease for rural leasehold land that is in an area of international conservation significance under the *Cape York Peninsula Heritage Act 2007* may be issued for a term of no more than 75 years if—
 - (a) the Minister considers that the lease land is in good condition; and
 - (b) an indigenous land use agreement relating to the land has been entered into; and
 - (c) 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.
- (7) This section is subject to sections 155A and 155B.

155A Extending particular term leases for a term of up to 40 years

- (1) This section applies to a lease if—
 - (a) the lease is for rural leasehold land; and
 - (b) the lease land is 100ha or more; and
 - (c) the term of the lease is no more than 30 years; and
 - (d) there is a land management agreement for the lease; and
 - (e) the land management agreement contains a commitment by the Minister to extend the lease under this section; and
 - (f) no more than 10 years have passed since the agreement was first registered; and
 - (g) 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 lessee has complied with the land management agreement and any requirements under it for the granting of the extension; and
 - (b) the lease land is in good condition.
- (4) However, the extension can not be for more than 10 years.

155B Extending particular term leases for a term of up to 50 years

- (1) This section applies to a lease if—
 - (a) the lease is for rural leasehold land; and
 - (b) the lease land is 100ha or more; and
 - (c) either—
 - (i) the term of the lease is for more than 30, but no more than 40, years; or
 - (ii) the term of the lease has been extended under section 155A; and
 - (d) the unexpired term of the lease is at least 10 years; and
 - (e) there is a land management agreement for the lease; and
 - (f) the land management agreement contains a commitment by the Minister to extend the lease if the following circumstances apply.

155D Power to reduce term of extended term lease

- (1) This section applies to a term lease if—
 - (a) it has been extended under section 155A and the Minister considers the lease land is no longer in good condition; or
 - (b) it has been extended under section 155B and an indigenous access and use agreement entered into under section 155B(1)(f)(iii) is no longer in effect in relation to the lease land.
- (2) The Minister may reduce the term of the lease by an amount that is no more than the period for which it was extended under section 155A or 155B.
- (3) However, the Minister can not reduce the term by an amount that results in the lease no longer having an unexpired term.

Note: A breach of a condition that the lessee comply with the land management agreement for the lease may also be dealt with by a remedial action notice.

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*; 29 Section 164 (Short term extension)
 - (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 conditions of the lease and any land management agreement for the lease;
 - (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 part of the lease land is needed for property build-up purposes of other properties without reducing the remaining land to less than a living area;
 - (l) whether the lease land could be subdivided without reducing the remaining land to less than a living area;
 - (m) whether a new lease is the most appropriate form of tenure for the lease land;
 - (n) the lessee's record of compliance with this Act;
 - (o) the natural environmental values of the lease land.

- (2) However, subsection (1)(d) applies only if the NCA department has given the chief executive—
- (a) a written notice stating the environmental or nature conservation purposes for which the part of the lease land is required; and
 - (b) either—
 - (i) a map showing the required particulars for a map of the part; or
 - (ii) a description of the boundary of the part by reference to Map Grid of Australia 1994 coordinates and zone references for the area.
- (3) If the lease contains a reservation that part of the lease land is a future conservation area the chief executive can not offer a new lease for that part.
- (4) 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.

- (5) 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 inspection 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:

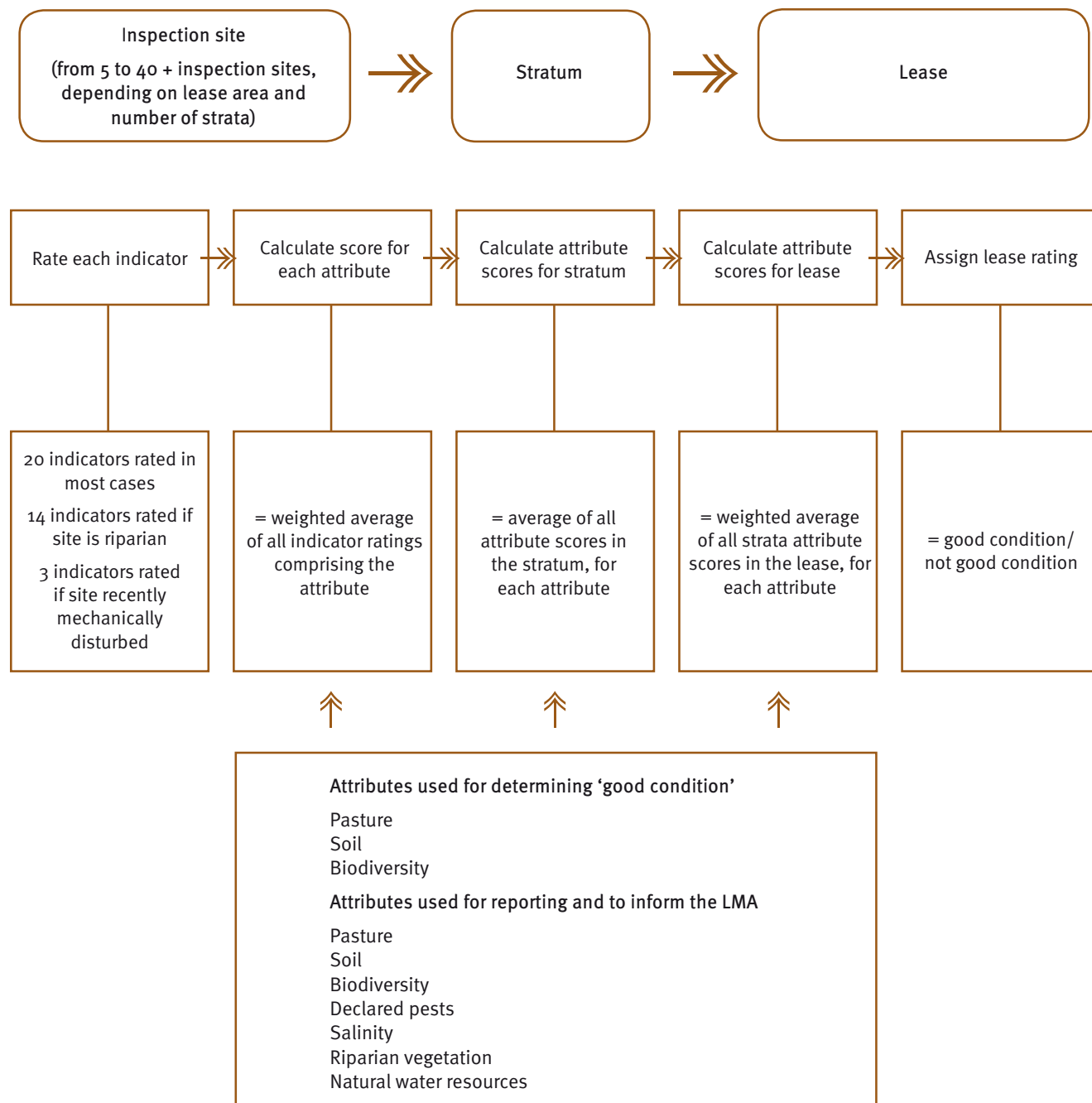
- (a) Decide condition for the whole lease.
- (b) Be based on indicators that:
 - (i) assess land degradation risk; and
 - (ii) have flow on impacts to other landscape components.
- (c) Take into account variability in condition across the lease.
- (d) Take into account variability in the condition of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

Indicator	Attributes						
	Pasture	Soil	Biodiversity	Declared pests	Salinity	Riparian vegetation	Natural water resources
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 ^{#+~}		4/5					4/5
Proportion of native ground layer species ^{#+}			5			5	
Density of native ground layer species ^{#+}			3			3	
Habitat and function – tree layer ^{#+}			4			4	
Habitat and function – shrub layer ^{#+}			4			4	
Habitat and function – ground layer ^{#+}			3			3	
Canopy species recruitment ^{#+}			3			3	
Canopy health ^{#+}			4			4	
Landscape context ^{#+}			4			4	
Declared pest plants ^{#*+°}			2	5		4	
Declared pest animals ^{#*+°}			2	5		3	
Salinity ^{#+}		5			5		3
Riparian area disturbance ⁺			3			4	3
Bank instability ⁺		4					4
Potential soil erosion ⁺		5					

+ Indicator of sites in riparian areas

* Indicator of sites in the recently mechanically disturbed stratum

Indicator of sites in the land type strata

~ The ground cover weighting is 4 if the slope of the assessment site is 3% or less, and is 5 if the slope is greater than 3%.

° Indicator not used in 'biodiversity' attribute if the site has previously been cleared.

Appendix E—Blank observation sheet

Inspection site identification			
Lease name		Slope	
Lease title reference		Land use	
Site number		Land type	
Date		Bioregion	
Time		GLM region	
Officer ID		Developed—not RE?	
Datum and zone		Riparian?	
Easting		Annual land type	
Northing		Mechanically disturbed?	

Site observations			
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 sep 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-scrub	open-scrub	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

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										
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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									

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 in the channel country:

- 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.

Canopy health category—one of the categories described in Figure 3.

Canopy species—the species in wooded regional ecosystems that are within the ecologically dominant layer (usually the tree layer) and any species in the emergent layer.

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 0–3m²/ha.

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

- a) Table S–3 if the tree basal area is 0–3m²/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 0–3m²/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 <www.derm.qld.gov.au>.

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 any of the following:

- a) are 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) a 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.

Land types—areas of grazing land with a characteristic pattern of soil and vegetation that have been identified by Queensland’s Department of Primary Industries and Fisheries. The land types of Queensland are listed at www.dpi.qld.gov.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.dpi.qld.gov.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.derm.qld.gov.au/nature_conservation/biodiversity/biocondition_benchmarks/. 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–6.

Preferred—any species, other than Indian couch (*Bothriochloa pertusa*), identified in the land type information sheet as either a:

- a) ‘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 <25 % of either TSDM or total pasture bases.

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

Recently mechanically disturbed—areas that are permanently cultivated and occasionally cultivated that have been disturbed within the last 12 months (such as for improved pasture or for forage cropping) and by blade ploughing (but not for land reclamation).

REDD—the Regional Ecosystem Description Database found at <www.derm.qld.gov.au/REDD>.

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 Table 5—‘Regional ecosystems where thinning cannot occur’ of the Regional Vegetation Management Code for Western Bioregions which is available at <www.derm.qld.gov.au>.

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

- a) benchmark data developed by the DERM, which is based on best on offer site(s) and other relevant material. Benchmark data can be found at <http://www.epa.qld.gov.au/nature_conservation/biodiversity/biocondition_benchmarks/>; 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 with greater than 60% remnant vegetation is any of the subregions listed in Table S–5.

Successfully regenerating—plants are greater than 0.5 metres high.

Terracettes—an erosion step caused by sheet erosion.

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.

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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