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Framework for sustainable pastoral management - Land condition version

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GOVERNMENT OF WESTERN AUSTRALIA

Department of
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Framework for sustainable pastoral management

Land condition version

Framework for sustainable pastoral management:

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Recommended reference

Fletcher R (2022) *Framework for sustainable pastoral management: Land condition version*, Department of Primary Industries and Regional Development, Western Australian Government.

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Contents

1 Background

Purpose

This document outlines the revised edition of the *Framework for sustainable pastoral management* (the Framework; Fletcher 2022), with a particular emphasis on the land condition components, including the monitoring, assessment and compliance processes.

These processes are now being used to guide the management of land condition on all pastoral leases and stations[1] within Western Australia (WA), which cover 860,000 km^2 and represents over 40% of WA's extensive rangeland area.

Pastoral lands reform

In 2018, the Western Australian Government announced a pastoral lands reform (PLR) initiative to update the management of pastoral lands and address the recommendations made by the Office of the Auditor General (OAG) 'to improve the sustainable outcomes for the pastoral industry and the communities it supports' (OAG 2017).

To achieve the reform objectives of improving pastoral lands management and regional economic opportunities, plus meet the OAG's recommendations of formally adopting the principles of ecologically sustainable development (ESD) (CoAG 1992), the Framework was developed (Fletcher 2020) and revised (Fletcher 2022).[2]

The Framework covers the diverse set of legislative and agency level requirements that are directly relevant for the management of the pastoral estate: *Land Administration Act 1997* (LA Act); *Soil and Land Conservation Act 1945* (SLC Act); *Biosecurity and Agriculture Management Act 2006* (BAM Act), *Animal Welfare Act 2002*. A key part of the Framework is the adoption of a contemporary, risk-based approach using internationally accepted best practice principles and practices designed for natural resource management (FAO 2014; Fletcher and Bianchi 2014; Fletcher 2015; ISO 2018).

Development of the Framework included extensive input from an Interagency Working Group and an Industry Reference Group. The final draft was subsequently submitted to the WA Government, which formally noted the Framework as a key component for progressing the PLR initiative. Given the specific emphasis of the OAG report, the initial focus for implementing the Framework has been to address land condition and degradation issues.

This shorter 'land condition version' has been developed to provide pastoralists and other stakeholders with an overview of the Framework with a clear focus on the land condition components.

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[1] A pastoral station contains one or more adjoining leases that are managed collectively.

[2] The revised edition clarifies the text and descriptions; it does not change the Government agreed management objectives, principles or processes presented in the first edition. References to the Framework now relate to Fletcher (2022).

1.1 Vision and scope

The strategic vision developed for the pastoral estate by the Interagency Working Group is that management of WA's pastoral lease resources leads to sustainable use of rangelands, supporting prosperous pastoral businesses, community wellbeing and biodiversity conservation for future generations**.**

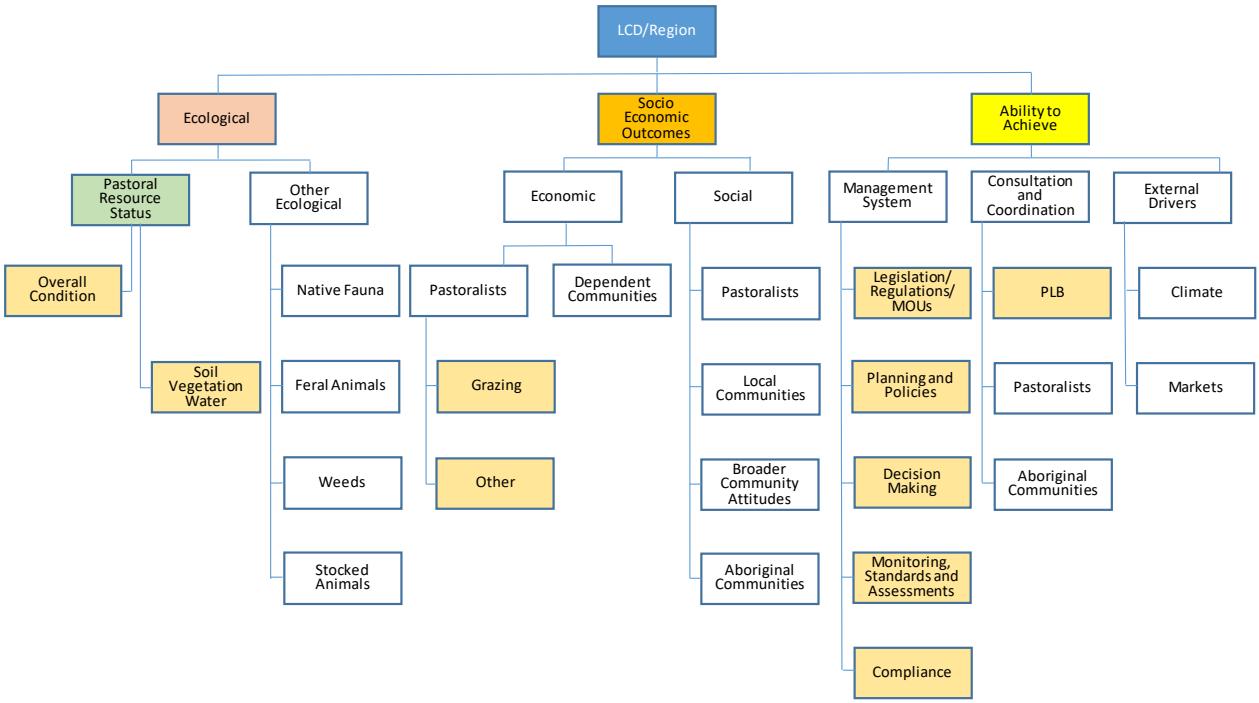
This vision covers all pastoral leases on Crown land granted under Part 7 of the LA Act that are to be used for pastoral purposes, which relates to the commercial grazing of authorised stock, largely on native rangelands vegetation.[3]

This vision is consistent with *The National Principles and Guidelines for Rangeland Management* (NRMMC 2010), which state that the 'ESD of natural resources should be the underlying principle for sustainable resource management in the rangelands' (Principle 1) and that there is the need to build resilience in rangeland ecosystems to manage the inherent uncertainties (climatic and economic) associated with the management of the pastoral estate (Principle 2).

The LA Act and the SLC Act have clear legislative requirements for leaseholders and land managers to ensure they appropriately manage the land resources on their lease(s). Combining these high-level principles and legal requirements, the primary ESD-based objective of the Framework is to maintain or improve overall land condition (including rangeland vegetation, soils and other attributes) at levels that ensure longer-term rangeland ecosystem function and industry productivity.

The Framework also identifies the other ESD-based objectives that address the legislative, regulatory, social and economic components needed for the effective management of the pastoral estate. As implementation of the Framework progresses, the scope of activities will expand to address all these issues and their interactions, which will facilitate the integrated management of the pastoral estate (Figure 1).

[3] See s93 LA Act for more details.



Note: Issues identified in OAG recommendations are shown as light orange boxes.

Figure 1: Initial ESD-based component tree for the pastoral estate

1.2 Risk-based decision making – land condition

The Framework uses a risk-based approach for the management of land condition that is consistent with contemporary natural resource management systems (FAO 2014). The determination of land condition status will use best practice risk assessment methodologies for resource management (SA 2018; Fletcher 2015) combined with the best available scientific evidence to determine the adequacy of current pastoral station management in respect of land condition outcomes.

Decision-making based on the risk assessments will be consistent with the NRMMC (2010) principle that prevention of resource degradation is more effective than rehabilitation, and ESD's precautionary principle that 'the lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation' (*Environment Protection and Biodiversity Conservation Act 1999,* Part 1, 3A).

A critical component of an effective risk-based management system is a clear description of what is, and is not, acceptable performance. The Framework, therefore, requires the development of regional-level quantitative land condition standards that will enable consistent and objective lease and station level assessments of land condition and land management effectiveness (Figure 2).

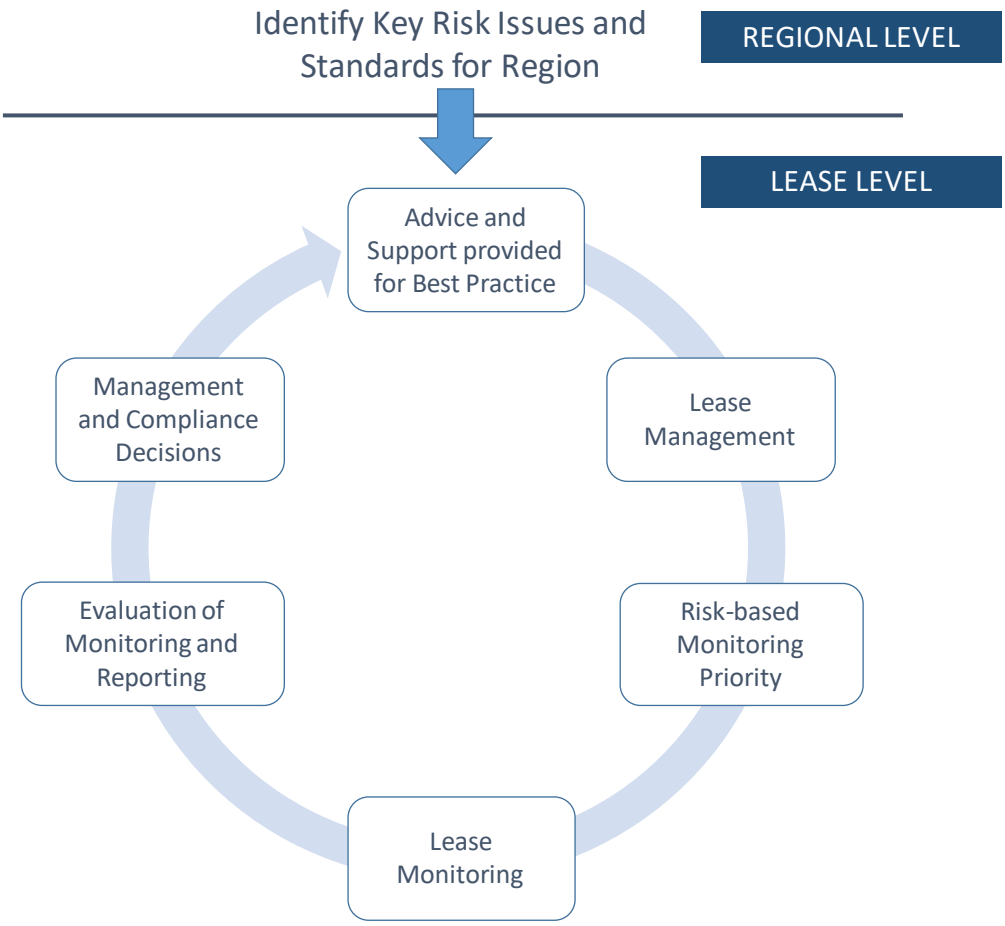


Figure 2: Risk-based pastoral lands management cycle

1.3 Developing land condition standards

The Framework recognises that effective land condition standards must accommodate the intersection between the different land condition objectives in the LA Act and the SLC Act. The Framework also clarifies which legislation has the legal precedence for decision-making and under what circumstances.

1.4 Legislative land condition objectives

Under the LA Act (s95), the Pastoral Lands Board (PLB) must 'ensure that leases are managed on an ecologically sustainable basis, develop policies to prevent degradation'. That is, maintain long-term productivity and ecosystem function.

Under the LA Act (s108): the lessee must 'manage and work the land to its best advantage as a pastoral property; use methods of best pastoral and environmental management practice; maintain the indigenous pasture and other vegetation'.

Under the SLC Act (s32): the lessee (land manager) must 'prevent and mitigate land degradation' which covers soil erosion, salinisation, eutrophication and loss of natural or introduced vegetation. That is, must maintain land condition, vegetation composition and ecosystem function.

1.5 Legal precedence

When the PLB is assessing whether a lease holder is maintaining suitable land condition, under the **LA Act (s108 [5]**), it 'must seek and have regard to the advice and recommendations of the Commissioner on the matter'

If the Commissioner of Soil and Land Conservation (the Commissioner) advises that compliance with any current lease conditions would tend to cause land degradation, the Minister may make any necessary modifications to the covenants, conditions, terms or provisions of the lease.

In addition, under **SLC Act s32**, the Commissioner can act independently of the PLB (and the LA Act) anywhere 'they consider land degradation is, or is likely, to occur', and issue a soil conservation notice (SCN) that specifies remedial actions that override any management specifications made under the **LA Act (s112)**. The Commissioner must, however, notify the PLB in writing of the terms of a proposed SCN before issuing the notice **(LA Act s138)**.

This means that if a soil conservation notice sets conditions on the numbers or distribution of stock on land under a pastoral lease, the notice has the effect, while it is in force, of suspending any determination under the **LA Act (s111)**, in relation to stock numbers and distribution, and the operation of any permit issued under Division 5 to the extent of any inconsistency.

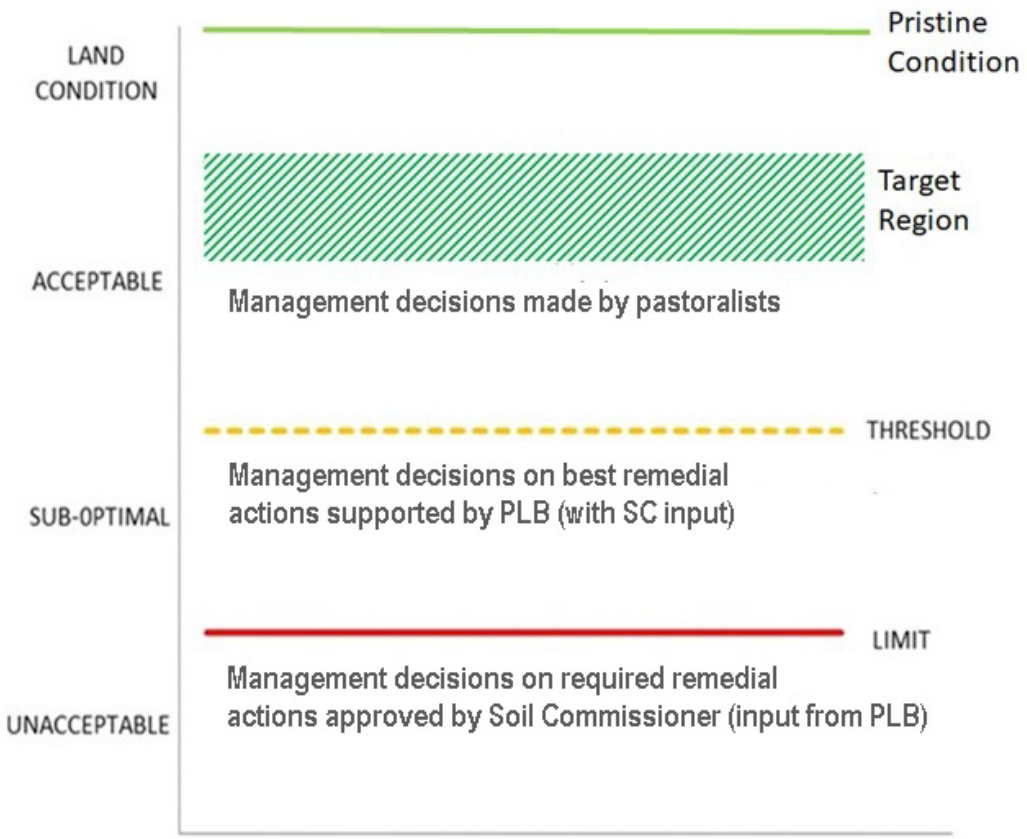
The ability for the Commissioner to take actions prior to a degradation event occurring is fully consistent with ESD's precautionary management approaches.

1.6 Three-category system of land condition status and standards

Based on the legislative requirements of the two Acts, their intersections and precedence, three categories have been defined for land condition status: acceptable, suboptimal, unacceptable (Figure 3). Conceptual standards have been developed for these three categories (Appendix A) from which specific target, threshold and limit levels will be determined for each pastoral region.

The Framework has also clarified who has primary responsibility for management decisions regarding operations, remediation or compliance associated with land condition status within the three categories:

- the lessee (when condition is near the Target)
- the PLB (when condition is approaching the threshold or already suboptimal)
- the Commissioner (when condition is approaching the limit or already unacceptable).



Note: Pristine refers to the land condition that could be expected in a pre-pastoral state.

Figure 3: Description of the conceptual standards including the target region (which equals 90–100% potential carrying capacity), threshold and limit for land condition and the decision-making responsibility for current lease management

1.7 Conceptual land condition status and standards

The full set of conceptual standards for land condition that outline the criteria that will be used for determining acceptable, suboptimal and unacceptable condition for each region is presented in Appendix A. In summary:

Acceptable (Land condition is above the threshold – compliant with LA and SLC Acts).

- Any declines in land condition of key pastures (the most pastorally important pasture types within a particular region) from the target range (Figure 3) are minor and temporary, easy to restore with conservative stock management, or targeted spelling and favourable seasons. In this condition, key pastures should be capable of providing sufficient fodder without being over-utilised through at least one poor season in high rainfall regions and at least two seasons in low/variable rainfall regions if stocked according to the station's current carrying capacity (CCC) with appropriate discounts for accessibility and development.
- There is minimal evidence of accelerated erosion, most of the land including key pastures is in good condition, and there is a very small percentage of key pastures in poor condition.
- CCC is greater than 70% of the potential carrying capacity (PCC) but this value can vary according to region or pasture type.

Suboptimal (Land condition between the threshold and limit – in breach of the LA Act s108 but not in breach of SLC Act s32)

- Declines in land condition of key pastures below the threshold are not expected to be permanent, and therefore possible to restore with conservative management (for instance, by spelling/conservative stocking), but full recovery may still take many years and favourable seasons.
- The percentage of key pastures in poor condition is still relatively low but the percentage of key pastures in good condition has declined.
- Bare ground and accelerated erosion are present but still minor.
- Specific problem areas may need complete destocking and/or mechanical intervention to restore or arrest further declines.
- CCC is 50–70% of the PCC but this value can vary according to region or pasture type.

Unacceptable (Land condition below limit – In breach of SLC Act s32 and LA Act s108)

- Extensive declines in land condition with relatively large areas of key pastures in poor condition and/or limited amount in good condition, with bare ground and accelerated erosion often evident.
- High probability of potentially permanent transition of key pastures to an altered (generally less productive) state if not addressed.
- Restoration may only be possible with complete destocking of large areas for extended periods combined with multiple favourable seasons, and possibly major mechanical or other direct interventions. The timeframe for recovery to an acceptable condition may be decades, if at all.
- CCC is less than 50% of the PCC but this value can vary according to region or pasture type.

1.8 Regional condition standards

There are a wide variety of landscapes, pasture types, ecosystems and climatic situations that occur across WA's extensive rangelands. They do not have uniform resilience or ability to recover from grazing and other perturbations, therefore separate quantitative standards are being developed for each rangeland region. The likely type of differences in the thresholds and limits for land condition in areas with different levels of productivity and landscape types are presented as indicative values in Appendix C.

While the regional standards will all be based on the same set of conceptual principles outlined above, they will be tailored to accommodate differences in the climate, geography, vegetation composition, vulnerability of the specific pasture types, productivity and ecosystem processes in that region.[4]

[4] Land condition standards for each rangeland region are being developed as part of a three-year Land Condition Workstream project (e.g. Fletcher et al. 2022).

1.9 Lease condition assessment and compliance regime

Consistent with the risk-based approach adopted within the Framework, the level of land condition assessment, including whether an on-ground rangeland condition assessment (RCA) will be undertaken for each lease/station, will be determined in a hierarchical, 'decision tree' manner based on 'risk' (Figure 4). This four-level, decision tree process begins with an annual desktop assessment of all leases to identify the highest 'priority' leases within each region. Moving to the next level of assessment and potential management intervention only occurs where necessary.

Outside factors (e.g. wildfire, cyclones, exotic disease) will be considered when making recommendations or requesting compliance with the standards.

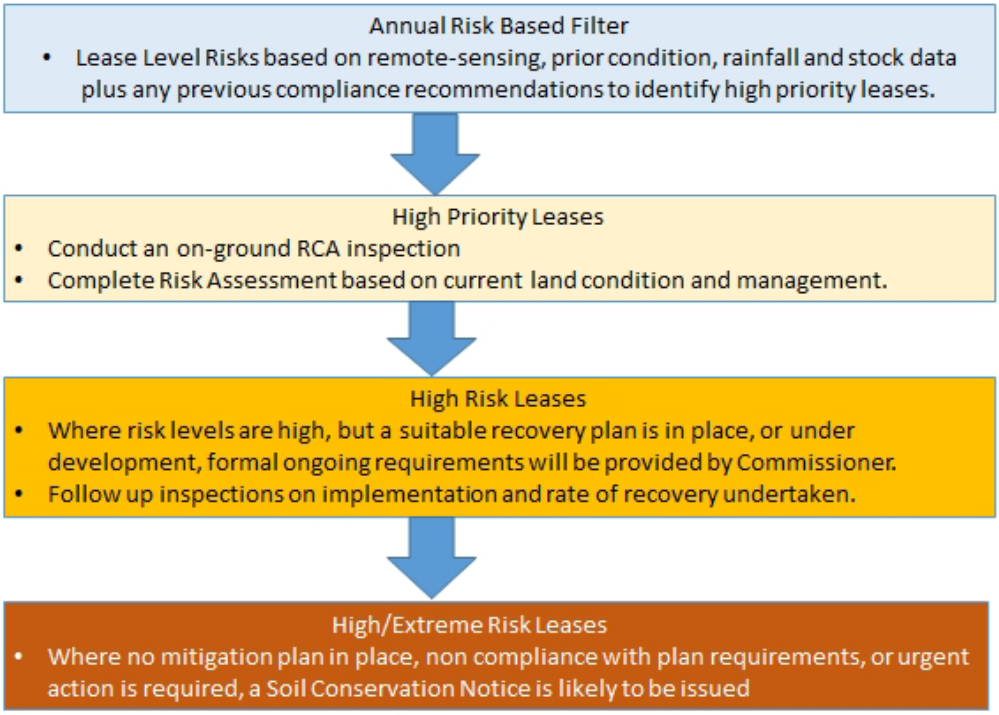


Figure 4: An outline of the decision tree process for determining the level of monitoring and compliance activities required for lease-level risk assessments, management plan requirements and potential enforcement actions

To expand on Figure 4, the four levels involve:

1. Annual risk-based assessment

   i. Relative risk levels will be calculated for all leases within each region using weighted measures that include:
      - the RCA condition as determined by the most recent on-ground assessment
      - antecedent and current seasonal conditions
      - antecedent and current stocking rates
      - spatial estimates of trends in vegetation cover and seasonal greenness response determined from remotely sensed data
      - accredited/audited management plans/reports (once in place)
      - local intelligence including knowledge of infrastructure.

ii. Other leases in each region may also be identified for an RCA based on:
- the length of time since their last RCA
- as a follow-up to assess compliance with previous directives/recommendations
- to complement the development of condition standards for the region.

iii. Based on the above inputs, a list of high-priority leases is developed and refined based on discussions with DPIRD and DPLH staff about regional-level issues, and where relevant, input from the identified lessees.

2. High-priority lease risk assessment (RCA)

iv. To determine if the lessee of a high-priority lease is sufficiently dealing with the land condition risks, a formal RCA will be completed.

v. If the assessment of land condition and land management effectiveness given preceding seasonal conditions suggests the key pastures on that lease are currently above and likely to remain above the threshold, the RCA will only be forwarded to the PLB for noting.

vi. If the RCA finds the condition is, or likely to be, below the threshold but remain above the limit for the coming 5-year period, the RCA assessment will be passed to the PLB for their consideration for possible actions under the LA Act.

3. High-risk station management plan development

vii. Where the RCA shows the one or more key pastures on the lease are currently below the limit but there is a documented mitigation plan and robust and clear evidence that suitable mitigation actions have already been taken and/or there have been adequate levels of condition recovery, no additional action by the Commissioner may be required. Monitoring by DPIRD will continue at appropriate intervals to ensure suitable management actions are maintained and a suitable recovery trajectory is still occurring.

viii. Where the condition status is above the limit but the risk of further decline below this level is high given the current management, the Commissioner and/or PLB may give the lessee a suitable period and assistance to develop and implement appropriate remedial actions, including a reporting and review schedule plus an expected condition recovery timetable (reflective of the risks and the region).

4. Regulatory enforcement/Soil conservation notice

ix. Where the status is near or below the limit and suitable mitigation methods have not already been implemented and/or further deterioration of one or more key pastures on the lease is occurring, or where there is a requirement for urgent action, specific orders will be given by the Commissioner, most likely under a SCN. The SCN will specify the mitigation actions to be taken and the level of recovery (based on meeting the regional-level standards to the satisfaction of the Commissioner) that will be required before it will be removed.

2 Monitoring, assessment and compliance

2.1 Land condition assessment process

The lessees of each of the identified priority leases/stations are contacted in writing by the Commissioner with follow-up communication by DPIRD rangelands staff. Communication with the lessee may include discussions to clarify specific issues with the station and the management system and infrastructure in place.

The RCA reports are based on the assessment of pastures and soil status at multiple locations along traverse routes across the station.

The assessment of land condition at each site along the traverse route is based on the relative abundance of key perennial pasture species that are present at the site and any evidence of erosion, not the presence of annual species. The timing of the RCAs in relation to seasonal conditions should not affect condition assessments.

Details of the current qualitative methods for the assessment of rangeland condition, plus regional-level pasture guides that describe good, fair, and poor condition for each of the key pasture types are available for most rangeland regions on the DPIRD website.

As part of the PLR process, quantitative (numerically based) measures of good, fair and poor pasture condition are being developed for use in future RCAs. These methods will determine the appropriate combination of quantitative information for each of the key pasture types for that region based on:

- satellite-derived measures of fractional cover (for example, percentage bare ground, and evenness of cover, vegetation indices and tree canopy cover)
- quantitative on-ground measures of pasture condition (for example, density, size, demography and health status of the main indicator species).

2.2 Land management effectiveness

Land management effectiveness is defined by the management behaviours that prevent or ameliorate land degradation while achieving optimal pastoral productivity.

An assessment of land management effectiveness is critical to estimating the likely future condition of a pasture or station. This assessment is used in a risk evaluation matrix (Table 1).

The core criteria used to rate land management effectiveness are:

Average stocking rate: Has the average stocking rates over the past 10 years been in line with CCC (adjusted for infrastructure and seasonal conditions)?

Adjustments for seasonal conditions: If average stocking rates are close to or above CCC, have there been clear, planned and implemented stock number adjustments based on changes in seasonal conditions?

Change in land condition: Is the land in an acceptable condition or at least clearly recovering?

Soil Stability: Are there minimal or declining areas with persistent bare ground.

Other factors that may contribute to effective land management, but are not directly used in the rating, include:

Governance: Is there a comprehensive management plan that has already been implemented and for which the outcomes and effectiveness of these arrangements have also been independently reviewed or audited?

Distribution of stock and pasture spelling: Has there been regular spelling of key pastures and active shifts of stock among pastures?

Total Grazing Pressure: Are feral and native herbivores actively controlled according to a station/regional plan?

Water points: Are there sufficient water points to spread grazing pressure and is there minimal pasture damage or erosion around each of the water points?

Fences: Is there sufficient fencing (or another suitable program) to directly control grazing pressure on key pastures?

Track maintenance and erosion control: Is best practice being used for track maintenance and erosion control?

The criteria for determining land management effectiveness outlined above are consistent with the best pastoral practices identified by the PLB.[5] More detailed descriptions of each level of land management effectiveness for these criteria are presented in Appendix B.

2.3 Risk evaluation – decision matrix

The land condition risk level for a lease is determined using the standard risk analysis methodology of a consequence by likelihood risk matrix (ISO 2018; ISO 2019). Generating the risk-based decision matrix for land condition (Table 1) is achieved by combining the assessment of current land condition status, as determined by the standards in Appendix A, with an evaluation of recent land management practices, as outlined in Appendix B.

[5] https://consultation.dplh.wa.gov.au/strategy-and-enagagement/good-pastoral-land-management-guidelines/

Table 1: Land condition risk matrix

Land condition status	Land management effectiveness		
	Low	Moderate	High
Acceptable	Medium	Low	Very low
Suboptimal	High	Medium	Low
Unacceptable	Extreme	High	Medium

Note: The matrix shows how the interaction of land condition status with land management effectiveness are combined to determine the risk of further land degradation. The management implications for each level of land degradation risk are outlined in Table 2.

The assessment of current land condition status is determined through an RCA. This is combined with the assessment of the land management effectiveness which is used as the indicator of the likely trajectory for future land condition. This is based on the expectation that where current land management effectiveness is high, there is a reduced likelihood of a decline from current land condition levels, and/or an increased likelihood that land condition will improve from current levels.

The generation of the current land condition risk level for a lease/station (from very low to extreme) therefore involves combining the scores determined for land condition (consequence) and land management effectiveness (likelihood). This assessment will also require providing suitable evidence for selecting the scores against the criteria as outlined in Appendices A and B.

This dual assessment approach assists the PLB and Commissioner take precautionary actions for situations where land condition is considered likely to fall below the threshold or the limit before the next RCA. It also enables good land management effectiveness to be formally acknowledged so that where suitable remedial actions have already been taken by the lessee there is no need to impose additional compliance actions.

Other benefits of improved land management effectiveness

While the criteria for land management effectiveness were developed to generate good land condition outcomes, higher levels of land management effectiveness are also likely to result in:

- good animal welfare
- improved rainfall use efficiency, better pasture growth and higher long-term carrying capacities
- improved price per head of turned-off livestock
- reduced need for frequent or major adjustments in stock levels
- potential to generate market-based rewards through branding of the station's sustainability credentials
- improved market access to some countries.

2.4 Risk mitigation responses

The expected risk mitigation and regulatory responses in relation to land condition risk category are described in Table 2.

Table 2: Land degradation risk level from Table 1 matrix and associated risk mitigation responses by decision maker

Land condition risk category	Expected risk mitigation response owner		
	Lessee	PLB (under LA Act)	Commissioner (under SLC Act)
Very low	Current management can continue; some stock increases may be possible	None required	None required
Low	Current management can continue; stocking is according to pasture and seasonal conditions	None required	None required
Medium	The lessee works with the PLB to improve management, or continues implementing an approved recovery program	The PLB, with input from the Commissioner and lessee, develops and ensures implementation of suitable management improvements	The Commissioner provides input to the PLB on condition trends and management options, or monitors approved recovery program
High	The lessee works to achieve specific condition outcomes issued by the PLB or Commissioner	With advice from the Commissioner, PLB may issue specific directions via a notice	The Commissioner specifies requirements directly to lessee, through the PLB or by issuing an SCN
Extreme	The lessee is required to achieve specific condition outcomes issued by the Commissioner; additional notices or actions may be issued by the PLB	The PLB may issue a notice to destock or take other actions, issue a default notice, and potentially recommend lease forfeiture	The Commissioner issues an SCN stating required mitigation actions and improvements to be achieved

Note: Section 1.9 has more detailed descriptions of the decision steps.

Appendix A Conceptual land condition standards

Table A1: Full description of conceptual standards for land condition

Condition status	Attributes and conceptual standards to determine pastoral land status
Pristine	The vegetation, biotic integrity and soil condition expected of rangelands that have not experienced pastoralism or any other form of development.
Acceptable	**Vegetation condition** – each key pasture type is largely in good condition as described in the regional pasture condition guides. That is, key pastures have the full complement of desirable species at the expected density. Typically, the percentage of sites in good condition would be relatively high and the percentage in poor condition would be very low for that pasture type. **Vegetation cover** – the level of total vegetation cover, given seasonal conditions, is at or above the level expected of pastures in good condition **Soil stability** – the areas of bare ground are stable and do not contribute to accelerated erosion; there is no visible scouring or sheet erosion; vulnerable areas have a high density of perennial plants. **Recovery** – from condition change with this status, is likely to occur with minor management and without mechanical intervention. **Productivity** – current carrying capacity (CCC) is greater than 70% of the potential carrying capacity (PCC) but this value can vary according to region or pasture type. **Management implications** – this condition status on a pastoral lease would not be in breach of the LA Act or SLC Act
Suboptimal	**Vegetation condition** – each key pasture type is largely in fair to good condition as described in the regional pasture condition guides. That is, key pasture types have a reduced complement of desirable perennials and at a lower density than expected of good condition pastures. Typically, the percentage of sites in good condition is moderate for the pasture type. The percentage in poor condition may still be low. **Vegetation cover** – the level of total vegetation cover, given seasonal conditions, is below the level expected of pastures in good condition and above the level in poor condition **Soil stability** –patches of bare ground are contributing to increased water runoff; there is some visible scouring or sheet erosion; there is evidence of reduced water-absorbing capacity; vulnerable areas have moderate to low densities of perennial plants. **Recovery** – to an acceptable status may need significant management changes and some level of mechanical intervention and could take many years depending on the region. Seedlings and young plants of indicator species for key pastures are missing; annual plants may dominate sites in many areas; plants might have abnormal growth. **Productivity** – the CCC is 50–70% of the PCC but this value can vary according to region or pasture type. **Management implications** – this condition status on a pastoral lease could be in breach of the LA Act but would not be in breach of the SLC Act

(continued)

Table A1 (continued): Full description of conceptual standards for land condition

Condition status	Attributes and conceptual standards to determine pastoral land status
Unacceptable	**Vegetation condition** –each key pasture is largely in poor to fair condition as described in the regional pasture condition guides. That is, desirable perennials are missing or at very low levels; annuals or undesirable species dominate the sites. Typically, the percentage of sites in poor condition will be relatively high and the percentage in good condition is at relatively low levels for that pasture type **Vegetation cover** – the level of total vegetation cover, given seasonal conditions, is at the level expected of pastures in poor condition **Soil stability** – there are extensive areas of bare ground contributing to accelerated erosion; soil loss is obvious; scours might be well developed and contiguous; most plants and rocks are raised on pedestals; there are well-defined deep gullies; water-absorbing structures are mostly absent; vulnerable areas have few or no perennial plants. **Recovery** – to suboptimal or acceptable status requires major management changes and extensive mechanical actions, which may take decades to take effect, or may not be possible for some pasture types. Propagation material of desirable perennials is very limited or absent; plants might have an abnormal growth form **Productivity** – the CCC is less than 50% of the PCC but this value can vary according to region or pasture type. **Management implications** – this condition status on a pastoral lease would be in breach of the LA Act and the SLC Act

Appendix B Land management effectiveness

Table B1: Core criteria to rate land management effectiveness

Practice	Land management effectiveness			How determined
	Low	Moderate	High	
Matching stocking rate to CCC	Stocking rate is more than 1.5 × CCC	Stocking rate is more than CCC and less than 1.5 × CCC	Average stocking rate over 5–10 years aligns with CCC	Average stocking rate over 10 years or since last RCA, PLB Annual Returns and RCA
Adjusting stocking rate to seasonal conditions	No active annual adjustments	Some or occasional adjustments	Clear planned adjustments. Stocking rate is adjusted in response to seasonal conditions	PLB Annual Returns, Bureau of Meteorology
Managing for pasture condition	Since last assessment, condition has declined to suboptimal or unacceptable levels or no improvement if already unacceptable	Since last assessment, condition has not changed and is suboptimal but not unacceptable	Since last assessment, condition has remained acceptable, or condition has improved but is still suboptimal or unacceptable	Current and previous RCA data
Managing for soil stability (to be developed)	% area of persistently bare ground, increase in % bare ground and severity of erosion	% area of persistently bare ground, stable % bare ground and severity erosion	% area of persistently bare ground, decline % bare ground and severity of erosion	Remote sensed products and RCA data

Table B2: Additional factors that may contribute to effective land management, but are not directly used in the rating

Practice	Land management effectiveness			How determined
	Low	Moderate	High	
Management planning and review	No clear planning or evidence of implementation of recommendations where a plan exists	Some explicit and documented planning and some evidence of implementation of recommendations	Independent and audited management plan is implemented and reviewed	Lessee communication [PLB]
Spelling of pastures or paddocks	No spelling	Some spelling	Pasture is spelled on a planned basis	Lessee communication
Feral and native herbivores control to manage total grazing pressure where required of lessee	No (or minimal) active control	intermittent control	Active control according to station or regional plan	Lessee communication
Fencing or water management to control grazing	Insufficient fencing (or other program) to manage grazing	Some fencing (or other program) to manage grazing	Extensive fencing (or other program) to manage grazing	Lessee communication Limited observation (traverse route)
Managing tracks, fences and other areas to control water movement and accelerated erosion	No erosion control treatments developed or if so are ineffective and/or poorly maintained, e.g. tracks interrupt and concentrate flow, and lead to uncontrolled track and other accelerated erosion	Limited erosion control treatments developed, with some evidence of maintenance where required, e.g. some tracks interrupt or concentrate flow, and lead to moderate track or other accelerated erosion.	Successful erosion control treatments developed and maintained, e.g. tracks do not interrupt or concentrate flow and prevent or limit accelerated erosion.	Lessee communication Limited observation (traverse route)

Appendix C Indicative thresholds and limits

Indicative examples of the types of threshold and limit levels that were used to initiate the development of regional-level quantitative assessment of pasture condition and erosion for the different landscapes are presented in Tables C1 and C2.

The threshold and limit values use the percentage of assessment sites for each landscape type that are classed as good or poor condition.

Table C1: Vegetation condition and erosion risk standards for Region X, a region of high pastoral potential

Vegetation condition	Threshold standard	Limit standard
Landscape type		
Alluvial plains	50% good or 10% poor	30% good or 20% poor
Cracking clays	40% good or 15% poor	25% good or 25% poor
Undulating plains	45% good or 7% poor	30% good or 17% poor
Erosion risk – area of bare ground		
Hill slopes	15%	30%
Undulating plains	10%	20%
Alluvial plains	5%	10%

Table C2: Vegetation condition and erosion risk standards for Region Y, a region of low pastoral potential

Vegetation condition	Threshold standards	Limit standards
Landscape type		
Alluvial plains	40% good or 20% poor	25% good or 35% poor
Cracking clays	35% good or 25% poor	20% good or 35% poor
Undulating plains	40% good or 15% poor	25% good or 25% poor
Erosion risk – area of bare ground		
Hill slopes	20%	40%
Undulating plains	15%	30%
Alluvial plains	10%	15%

Appendix D Terms used

Table D1: Terms used in this document

Term	Description
Commissioner	Commissioner of Soil and Land Conservation
Current carrying capacity (CCC) also referred to as present carrying capacity (see also potential carrying capacity [PCC])	The long-term carrying capacity of an area of land or station based on the pasture type and current condition, assuming all water and other infrastructure are in place to facilitate managed grazing across the station. Not the PCC, which assumes all pastures are in good condition
DPIRD	Department of Primary Industries and Regional Development
DPLH	Department of Planning, Lands and Heritage
ESD	ecologically sustainable development
Key pastures	The most pastorally important pasture types within a particular region. Sufficient key pasture types are identified to ensure at least two are present on every station in the region and combined they make a significant contribution (generally >80%) to the potential carrying capacity of the station. The key pastures are the focus of monitoring and assessment to determine the land condition status of a station
LA Act	*Land Administration Act 1997*
Limit (land condition standard)	The pasture condition standard below which pastoral productivity or soil erosion are unacceptable and the likelihood of transitioning to an alternative state has increased to an unacceptable risk. Land condition below the limit is no longer consistent with meeting objectives of the SLC Act
Monitoring and assessment unit (MAU)	The most pastorally important landscapes/pasture groups (based on their pastoral productivity, management characteristics and erosion hazard). In the West Kimberley these are Alluvial, Frontage, Plains Hummock grass and Plains Tussock grass
OAG	Office of the Auditor General
PLB	Pastoral Lands Board
PLR	Pastoral lands reform
Potential carrying capacity (PCC)	The long-term carrying capacity of an area of land assuming all pasture types are in good condition and assuming all water and other infrastructure is in place to facilitate managed grazing across the station

(continued)

Table D1 (continued): Terms used in this document

Term	Description
Pristine (land condition standard)	The vegetation, ecosystem and soil condition expected of rangelands that have not experienced pastoralism or any other form of development
Rangeland condition assessment (RCA)	The method used by DPIRD for assessment of pasture condition and erosion on an individual pastoral station
SCN	soil conservation notice
Seasonal quality	Indication of the relative value of rainfall for a period (amount and distribution) that supports vegetation growth
SLC Act	*Soil and Land Conservation Act 1945*
Spell/spelling	Removal of all domestic livestock and control of native and feral herbivores (if required) for a period, to allow recovery of leaf area and root energy reserves of mature desirable plants, germination of other plants in addition to desirable plants, and to allow seed production and release
Suboptimal condition (land condition status)	Where pasture condition and productivity are below the threshold levels and above the limit. There is less good condition pasture than is acceptable, there are only relatively low levels of poor condition and erosion, with a station requiring targeted areas of remediation
Target (land condition standard)	The pasture condition, pastoral productivity and soil erosion are all considered optimal for meeting objectives of the LA Act and long-term economic outcomes. This would very be close to 100% of the PCC
Transition	The change from one pasture type ‘state’ to another such that the suite of species, productivity, soil condition and ecology of an area is significantly and permanently altered
Threshold (land condition standard)	The pasture condition standard below which pastoral productivity or soil erosion is suboptimal and therefore no longer consistent with meeting objectives of the LA Act
Unacceptable condition (land condition status)	Where pasture condition and productivity are below the limit standard. There is significant soil erosion present and significant loss of pastoral productivity and pastures are considered at high risk of permanent transitioning to a less productive state. If not already underway, the station/area requires immediate and significant remedial actions under the SLC Act
WA	Western Australia
Western Australian rangeland monitoring system (WARMS)	A system of permanent rangeland monitoring sites in pastoral Western Australia; established by the then Department of Agriculture Western Australia in the early 1990s and currently operating under DPIRD

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