



Department of
Primary Industries and
Regional Development

Digital Library

Natural resources published reports

Natural resources research

2022

Framework for sustainable pastoral management - Revised edition

R Fletcher

Department of Primary Industries and Regional Development, Western Australia,
rick.fletcher@dpird.wa.gov.au

Follow this and additional works at: https://library.dpird.wa.gov.au/lr_publishedrpts



Part of the [Natural Resources Management and Policy Commons](#), and the [Sustainability Commons](#)

Recommended Citation

Fletcher R (2022) Framework for sustainable pastoral management, revised edition, Department of Primary Industries and Regional Development, Western Australian Government.

This report is brought to you for free and open access by the Natural resources research at Digital Library. It has been accepted for inclusion in Natural resources published reports by an authorized administrator of Digital Library. For more information, please contact library@dpird.wa.gov.au.



Department of
**Primary Industries and
Regional Development**

Framework for sustainable pastoral management

Revised edition



Framework for sustainable pastoral management

Revised edition

Rick Fletcher

© State of Western Australia (Department of Primary Industries and Regional Development) 2022



Unless otherwise indicated, *Framework for sustainable pastoral management*, revised edition, by Department of Primary Industries and Regional Development is licensed under a [Creative Commons Attribution 4.0 International Licence](https://creativecommons.org/licenses/by/4.0/). This report is available at dpird.wa.gov.au.

The Creative Commons licence does not apply to the State Crest or logos of organisations.

Recommended reference

Fletcher R (2022) *Framework for sustainable pastoral management*, revised edition, Department of Primary Industries and Regional Development, Western Australian Government.

Disclaimer

The Chief Executive Officer of the Department of Primary Industries and Regional Development, and the State of Western Australia accept no liability whatsoever by reason of negligence or otherwise arising from the use or release of this information or any part of it.

Copies of this document are available in alternative formats upon request.

Department of Primary Industries and Regional Development
3 Baron-Hay Court, South Perth WA 6151
Telephone: +61 (0)8 9368 3333
Email: enquiries@dpird.wa.gov.au
Website: dpird.wa.gov.au

Contents

Preface	iv
1 Introduction.....	1
2 Background.....	2
3 Risk-based framework and approach.....	4
4 Clarity of responsibilities	6
4.1 Linkages among relevant parties	6
4.2 Relevant legislative and policy elements	7
5 Scope of pastoral management	11
5.1 Strategic vision statement for the pastoral estate.....	11
5.2 Scope of issues to address.....	11
6 Developing risk-based pastoral management	13
6.1 Risk-based decision-making	13
6.2 Risk-based pastoral management cycle	14
6.3 Developing land condition conceptual standards	16
7 Overview of land condition assessment and compliance system	21
7.1 Regional-level monitoring and standards.....	21
7.2 Lease-level monitoring and assessment.....	21
7.3 Land management effectiveness	23
7.4 Risk-based lease evaluation and decision matrix for land condition compliance	25
8 Detailed description of assessment methods	26
8.1 Regional land condition standards.....	26
8.2 Annual land monitoring program.....	27
8.3 Annual risk-based lease assessment.....	28
8.4 Lease assessment process	29
8.5 Land condition risk level and regulatory response	30
8.6 Assessing the risk for other Acts and ESD requirements	31
Appendix A Relevant legislative statements.....	32
Appendix B Risk assessment tables (non-land condition)	34
Appendix C Full description of conceptual standards	36
Appendix D Full description of land management effectiveness	38
Appendix E Fictitious case studies using risk evaluation matrix.....	40
Shortened forms	51
References.....	52

Preface

This revised edition of the *Framework for sustainable pastoral management* contains clarifications of terms used plus general editing to improve readability. Importantly, it does not change any of the Government agreed management objectives, principles or processes presented in the original edition.

The significant roles the Interagency Steering Committee and the Industry Reference Group played in the development of the first edition of the Framework is still acknowledged.

Thanks to staff of the Rangelands Science group and other staff of the Agriculture Resource Management and Assessment Branch within the Department of Primary Industries and Regional Development (DPIRD) for their assistance in clarifying terms used to describe the principles in the revised edition and for the editing undertaken.

1 Introduction

This *Framework for sustainable pastoral management*, revised edition (the Framework) describes the contemporary risk-based approach that is now being used within Western Australia (WA) to ensure management of the State's pastoral estate meets the principles of ecologically sustainable development (ESD).

Development of the Framework was undertaken as part of the Pastoral Lands Reform project initiated by the WA Government in response to the Office of the Auditor General's (OAG 2017) report, *Management of pastoral lands in Western Australia*.

The Framework was developed by DPIRD with input from the Interagency Steering Committee (ISC – which included senior representatives of the WA Government agencies with direct responsibilities for management of the pastoral estate) plus an Industry Reference Group (IRG – which included representatives from the Pastoral Lands Board and pastoral industry bodies).

The Framework has already been formally noted by the WA State Cabinet as an integral part of the pastoral land reform process needed to address the Auditor General's recommendations.

A key element of the Framework is that it recognises the wide suite of legislative, regulatory and other requirements that the pastoral industry will need to meet to satisfy the WA and broader international community's growing expectations about what is now known as environmental, social and governance (ESG) responsibilities.

The focus for this edition of the Framework has been to detail the risk-based systems and management processes that will be used to address land condition issues. It, does, however, outline how this approach can be used to expand the scope and progressively cover all the identified OAG, ESD and ESG requirements of WA's pastoral industry.

2 Background

Pastoral leases and stations in Western Australia

The information presented in the Framework is relevant to all parties involved in the management of pastoral leases/stations¹ in Western Australia (WA). The effective implementation of the legislative based systems and administrative processes detailed within the Framework will be critical for ensuring that the pastoral estate (those areas with pastoral leasehold tenure), which covers nearly 860,000 km² which represents over 40% of WA's extensive rangeland areas, is managed appropriately for the benefit of current and future generations of the WA community.

Pastoral lands reform

In October 2017, the Western Australian Government announced it would have a renewed focus on pastoral lands reform with the aim of delivering enhanced economic, social and environmental outcomes generated on pastoral lands. The pastoral lands reform initiative was aimed at facilitating improvements in the ecological sustainability of land and provide more opportunities for economic growth so that the full economic and social potential of the pastoral estate can be realised for the people of Western Australia.

On 30 July 2018, State Cabinet gave approval for the Minister for Agriculture and Food in consultation with the Minister for Lands, to undertake a pastoral lands reform initiative. The reforms relate to improving the sustainable management of pastoral lands to address the recommendations made by the Office of the Auditor General (OAG) in the *Management of the pastoral lands in Western Australia* (OAG 2017), which found that 'the ecological sustainability of the pastoral estate was not adequately protected by the current system of monitoring and administration'.

The OAG report also identified that the 'the current cooperative approach to compliance, using pastoral liaison to help lessees comply with the *Land Administration Act 1997* [LA Act], provides limited visibility of the extent of land condition issues across the pastoral estate'.

Based on the findings, the OAG report included several recommendations designed 'to improve the sustainable outcomes for the pastoral industry and the communities it supports'. These recommendations covered a wide range of components, including the need to:

- develop an annual action plan to accompany the Pastoral Lands Board (PLB) strategic plan to inform pastoral lands management
- define and adopt an interagency definition of 'ecological sustainability' for pastoral lands
- develop and implement a rigorous compliance program based on regular land condition monitoring that includes a combination of risk-based and systematic inspections and checks of pastoral lessee annual returns and an interagency

¹ Where more than one lease is managed collectively, these are normally referred to as pastoral stations. Any reference to a pastoral lease also applies to a pastoral station.

compliance database promote better coordination of pastoral lands management by all entities involved review performance in line with the Public Sector Commission's *Good governance checklist*

- develop and implement a reliable statewide system to monitor changes in land condition within the pastoral rangelands
- publish policies and provide guidance on good practice pastoral lands management techniques.

In late 2018, the WA Government announced the development of a reform package designed to improve economic and sustainable development conditions in the pastoral estate. The key proposals included developing and embedding robust monitoring and compliance processes which could enable improved security of tenure for pastoralists and foster long term 'sustainable thinking'.

It was recognised that undertaking any tenure reform would need to be interdependent with management system enhancements to generate improved sustainable ecological outcomes. Furthermore, if the monitoring and compliance processes were to directly affect security of tenure, there needed to be clear land condition standards to enable consistent and objective assessment of the land condition status of a pastoral lease. It was also acknowledged that a continuum of compliance would be needed that extended from education, awareness, capacity building through to direct enforcement of legislative requirements.

The PLB (2018) had also identified that 'economic development and ecological management of pastoral lands are interdependent' and 'achieving a balance of both is possible provided the policy and administrative environment is constructed appropriately. In particular, the PLB believes that this will require creating an environment where government works cooperatively with pastoral lessees to enhance productivity and financial viability to achieve improved land management outcomes.'

A significant external driver for improved pastoral management over the next decade is that national and international markets are increasingly requiring individual businesses and sectors to formally demonstrate their ESG credentials to maintain a social licence to market their products. For the pastoral industry this will not only include meeting wider community expectations related to land management, but also broader environmental and animal welfare issues.

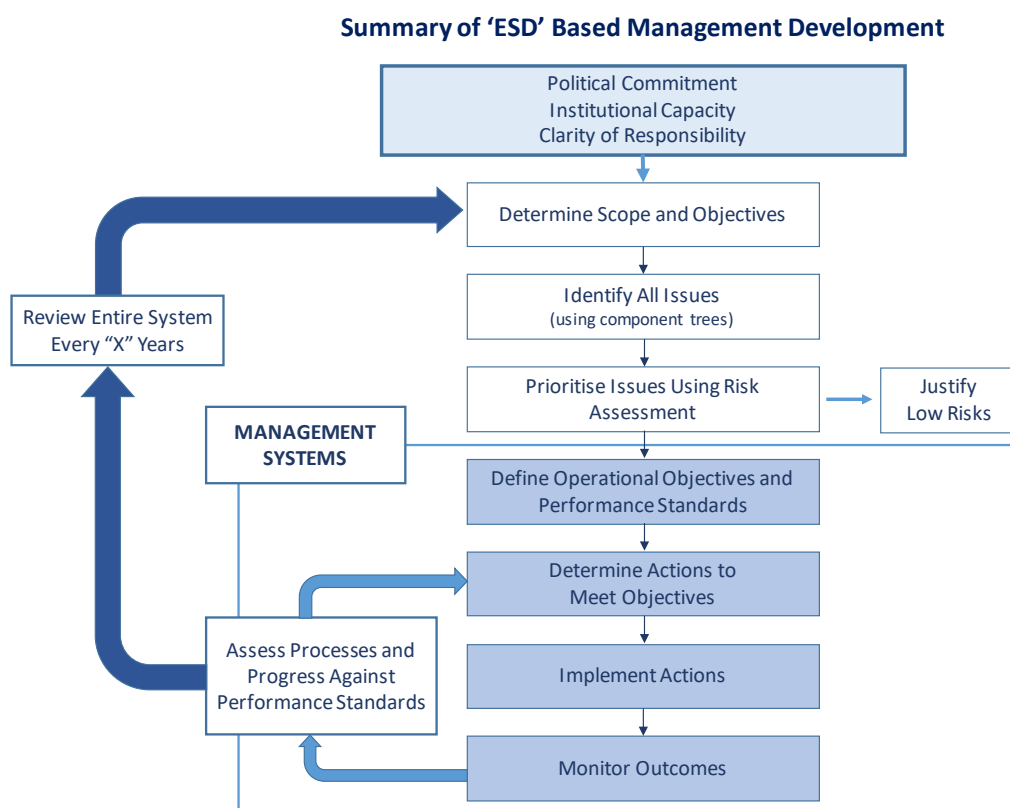
To robustly demonstrate that these expectations are being met will require having auditable management outcomes and systems. In this respect, while monitoring programs for rangeland condition have been used in WA and elsewhere, these have not had explicit outcome-based standards for assessments or compliance. Establishing such auditable schemes across the spectrum of legislative requirements relevant to pastoral activities in a practical and cost-effective manner cannot be done quickly.

Each of the monitoring, assessment and compliance systems that are developed as part of the pastoral reform initiative must also be consistent with the recommendations of the WA Public Sector Service Priority Review. This requires all agencies that undertake regulatory reform adopt a risk-based and outcome focused approach.

3 Risk-based framework and approach

To achieve the Government's pastoral land reform objectives to improve pastoral lands condition and economic opportunities plus meet the OAG's recommendations requires the adoption of a contemporary framework that is based on internationally accepted best practice risk management (ISO 2018) and ESD principles (Figure 1).

This Framework was developed and formally noted by State Cabinet in November 2019, is consistent with that used for the *Western Australian natural resource management program* (DPIRD 2018). It was based on the ESD and risk-based approaches developed in Australia (e.g. Fletcher 2002) and subsequently endorsed by the United Nation's Food and Agriculture Organization (FAO) for application of sustainable development principles to their natural resource management (NRM) programs (FAO 2014; Fletcher and Bianchi 2014).



Source: Adapted from FAO (2014).

Figure 1: Outline of the steps involved in completing the ISO 31000 risk management processes (ISO 2018) plus the foundational elements needed to deliver the effective ESD-based management of natural resources

Figure 1 identifies the set of foundational activities that are not in standard risk management guidelines but are considered necessary based on the experiences of implementing an ESD approach across a wide number of resource management scenarios and countries. These studies identified that the level of clarity obtained for each of the foundational elements prior to beginning the standard risk management steps directly affected the robustness and effectiveness of the resultant management system (Fletcher 2008; FAO 2014; Fletcher and Bianchi 2014).

The key foundational elements required for the development and subsequent implementation of the Framework were:

- **Political commitment** – This was confirmed through the acceptance of the Nov. 2019 Cabinet Submission formally noting the use of this Framework.
- **Institutional capacity** – This was addressed through funding of the pastoral land reform project (land condition and monitoring workstream) in September 2020.
- **Clarity of responsibilities** – A clear legislative scope for pastoral lands management has now been documented that includes clarifying the relevant primary and secondary legislation that need to be considered in management, plus all other relevant government and stakeholder policy initiatives. The relationships and precedence among these legislative instruments have now been formally determined. These elements are detailed in the following section.

In addition to the foundational elements, clarification of the following elements (which are detailed in later sections) also assisted in the development and practical implementation of the Framework:

- **Vision, scope and objectives** – Developing a practical definition of ecologically sustainable development for the rangelands and clearly articulated operational level objectives for environmental, economic, social and governance outcomes that can be applied to achieve the overall community vision for pastoral regions.
- **Conceptual standards** – Based on the operational objectives and legislative scope; conceptual standards for land condition and land management effectiveness have been developed to better determine acceptable levels of performance, undertake objective risk assessments, and inform when compliance actions are required.
- **Stakeholder engagement** – Appropriate engagement with key government and industry stakeholders that occurred during the development of the Framework.

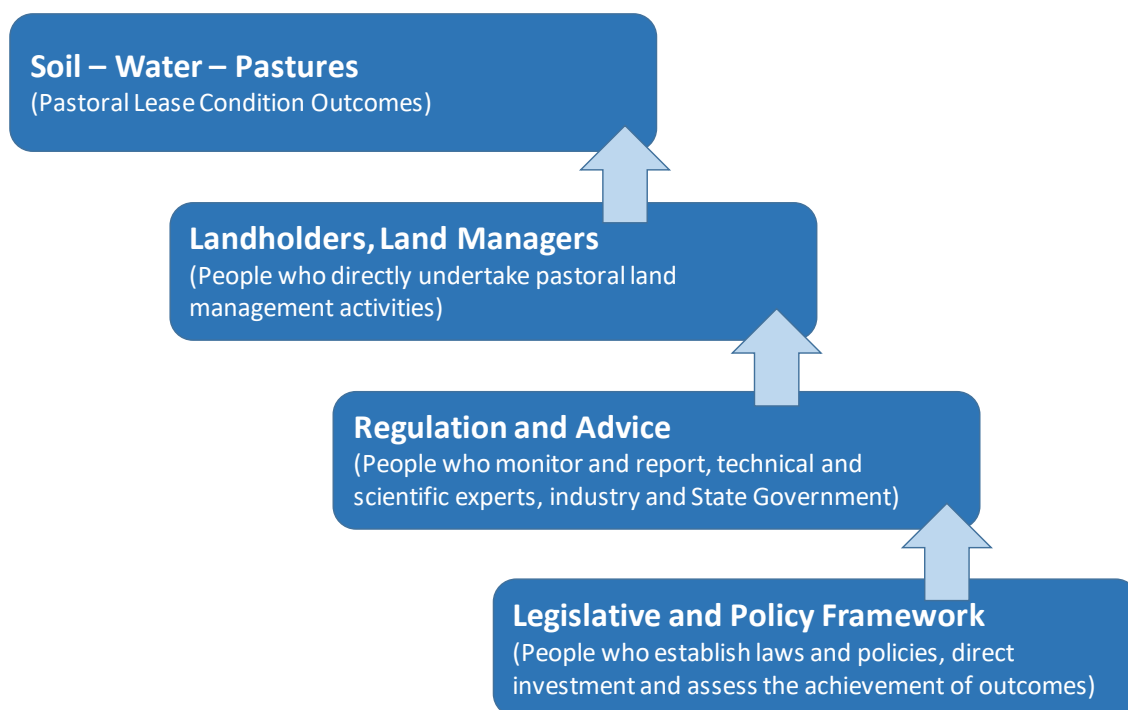
4 Clarity of responsibilities

4.1 Linkages among relevant parties

Consistent with the overarching WA Natural Resource Management Framework (DPIRD 2018), the successful management of WA's pastoral estate involves many government and non-government agencies, private businesses, aboriginal organisations in addition to pastoral lessees.

To achieve the Government's objectives and OAG's recommendations of improving the sustainable outcomes for the pastoral industry and the communities it supports, industry and government agencies need to work together in partnership to ensure there is a balanced approach to the management of pastoral resources for the long term. Planning and decision-making need to recognise the linkages of the economic and social benefits that are dependent on the environmental values of the pastoral estate to deliver both public and private interests.

To ensure that the pastoral lease condition outcomes are acceptable, there needs to be a clearly understood pathway that directly links the high level legislative and policy setting process of government through the development of appropriate regulations and advice provided by agencies, that pass into the on-ground management practices that are undertaken by land managers (Figure 2).



Source: DPIRD (2018).

Figure 2: Linkages between lessees, industry and government who need to work in partnership to sustainably manage the pastoral estate

4.2 Relevant legislative and policy elements

This Framework covers the management of all pastoral leases on Crown land granted under Part 7 of the LA Act, which are to be used for ‘pastoral purposes’ which relates to the commercial grazing of ‘authorised stock’, largely on native rangelands vegetation.

Each of these leases has a set of conditions that has been established by the Minister, in consultation with the PLB, which can include any terms, reservations, conditions, covenants or penalties not inconsistent with the LA Act. The legislative requirements for a lease holder fall into three main categories.

4.2.1 Primary legislation (directly affects lease renewals, lease-based operations and activities)

Division 4 (s103–114) of the LA Act outlines the ‘standard’ *Conditions of a pastoral lease*. These conditions directly refer to the following three Western Australian Acts:

- [Soil and Land Conservation Act 1945](#) (SLC Act)
- [Biosecurity and Agriculture Management Act 2007](#) (BAM Act)
- [Land Administration Act 1997](#)

Importantly, if a lessee is in breach of the conditions related to these Acts, this can result in default notices being issued and these breaches can even result in the lease being forfeited.

The following summarises the main elements of these three Acts that are relevant for the management of pastoral leases. It also outlines where there are legislative intersections and which of the Acts has precedence.

LA Act

PLB – Under **LA Act (s 95)**, the PLB is the statutory authority that has joint responsibility with the Minister for Lands (the Minister) for administering WA pastoral leases. The functions of the PLB include:

- ensure that pastoral leases are managed on an ecologically sustainable basis
- develop policies to prevent the degradation of rangelands
- develop policies to rehabilitate degraded or eroded rangelands and to restore their pastoral potential
- monitor the numbers and the effect of stock and feral animals on pastoral land.

Lessees – Under the **LA Act (s108)**, the lessee must, to the satisfaction of the Board:

- ‘at all times manage and work the land under the lease to its best advantage as a pastoral property’
- ‘use methods of best pastoral and environmental management practice, appropriate to the area where the land is situated, for the management of stock and for the management, conservation and regeneration of pasture for grazing’
- ‘must maintain the indigenous pasture and other vegetation on the land under the lease’.

SLC Act

Commissioner of Soil and Land Conservation – Under the **SLC Act (s13)**, one of the functions of the statutory appointed Commissioner of Soil and Land Conservation (the Commissioner) is to prevent and mitigate land degradation – including soil erosion, salinity, eutrophication and flooding, and the removal or deterioration of natural or introduced vegetation – that may be detrimental to the present or future use of land. To achieve this, the Commissioner may undertake activities including:

- ‘the investigation and design of preventive and remedial measures in respect of land degradation’
- ‘the instruction and supervision of landholders in matters pertaining to soil conservation and reclamation’
- ‘the carrying out of works authorised by this Act’.

Lessees – Under the **SLC Act (s32)**, the lessee must ‘prevent and mitigate land degradation’, as defined above. The lessee must maintain appropriate land condition, composition and ecosystem function.

BAM Act

A core function of the BAM Act is to prevent or reduce biosecurity threats to agriculture and pastoralism, including threats to native pasture and ecologically sustainable pastoral management. Under the BAM Act and LA Act, DPIRD is responsible for commenting on biosecurity threats.

Under the **LA Act (s110)**, the pastoral lessee must ‘not sow or cultivate non-indigenous pasture on land under the lease, except in accordance with a diversification permit’.

Pastoral lessees must comply with other elements of the BAM Act. This includes:

- not importing a prohibited organism except in accordance with an import permit and the regulations [Section 15 (1)]
- not keeping, breeding, cultivating or supplying a declared pest [Section 23 (a)]
- taking the prescribed measures to control declared pests (Section 30).

4.2.2 Legal precedence for land condition compliance under SLC and LA Acts

When the PLB is assessing whether a lessee 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 advises that compliance with any 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.

Under **SCL Act s32**, the Commissioner can also 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. The Commissioner must, however, notify the PLB in writing of the terms of a proposed SCN before issuing the notice (LA Act s138).

If a SCN sets conditions on the numbers or distribution of livestock on land under a pastoral lease, the notice has the effect, while it is in force, of suspending any

determination under **Section 111** of the LA Act in relation to stock numbers and distribution, and the operation of any permit issued under Division 5 of the LA Act.

More details on these aspects of the LA and SLC Acts are presented in Appendix A.

4.2.3 Secondary legislation (directly affects lease-based operations and activities)

While the following set of legislation directly affects the operations of most pastoral leases, they are generally not specific conditions of pastoral leases. So, while a lessee can be penalised under the provisions of these Acts for any breach, such a breach may not directly affect their lease tenure.

Secondary legislation includes:

Western Australian

- *Animal Welfare Act 2002* (AW Act)
- *Biodiversity Conservation Act 2016* (BC Act)
- *Environmental Protection Act 1986* (EP Act)
- *Conservation and Land Management Act 1984*
- *Aboriginal Heritage Act 1972*

Commonwealth

- *Native Title Act 1993*

Animal Welfare Act

Pastoral lessees must comply with the AW Act, including the following (adapted from the AW Act).

A person is prohibited from:

- torturing, mutilating, maliciously beating or wounding, abusing, tormenting or otherwise ill-treating an animal
- using a prescribed inhumane device on an animal
- intentionally or recklessly poisoning an animal
- doing any prescribed act to, or in relation to, an animal
- causing an animal unnecessary harm in any other way.

A person in charge of an animal is cruel to an animal if the animal:

- is transported in a way that causes, or is likely to cause, it unnecessary harm
- is confined, restrained or caught in a manner that is proscribed or causes, or is likely to cause, it unnecessary harm
- is worked, driven, ridden or otherwise used when it is not fit to be so used or has been overused, or in a manner that causes, or is likely to cause it unnecessary harm
- is not provided with proper and sufficient food or water.

Other relevant environmental legislation

Pastoral lessees must also comply with the BC Act and the EP Act. This would include ensuring clearing activities, such as those related to clearing for fences, are approved.

Appropriate assessment methods for monitoring, assessment and compliance of any specific risk issues related to these Acts will be identified in regional assessment will be added in future editions of this Framework.

Carbon capture

If pastoral lessees have a carbon capture agreement in place, this agreement will have its own set of management, monitoring and compliance requirements.

Appropriate assessment and monitoring protocols for these items will be added in future editions of this Framework.

4.2.4 Other legislation and policies

As with any business operation, lessees must also comply with all other legislative and regulatory instruments under federal, state and local authorities. These regulatory instruments would only be identified through the application of the framework if they were specific relevant to affecting pastoral operations in one or more regions.

Several other policy considerations may influence what is required of lessees, including:

Policy frameworks

- election commitments, government policy initiatives
- OAG recommendations

Administrative agencies/bodies

- Department of Planning, Lands and Heritage (DPLH)
- DPIRD
- PLB

Referral agencies

- Department of Water and Environmental Regulation
- Department of Biodiversity, Conservation and Attractions
- Department of Mines, Industry Regulation and Safety

Other key groups

- stakeholder groups (e.g. Pastoralists and Graziers Association, Western Australian Farmers Federation, Kimberley Pilbara Cattlemen's Association)
- Regional NRM bodies
- Recognised Biosecurity Groups

5 Scope of pastoral management

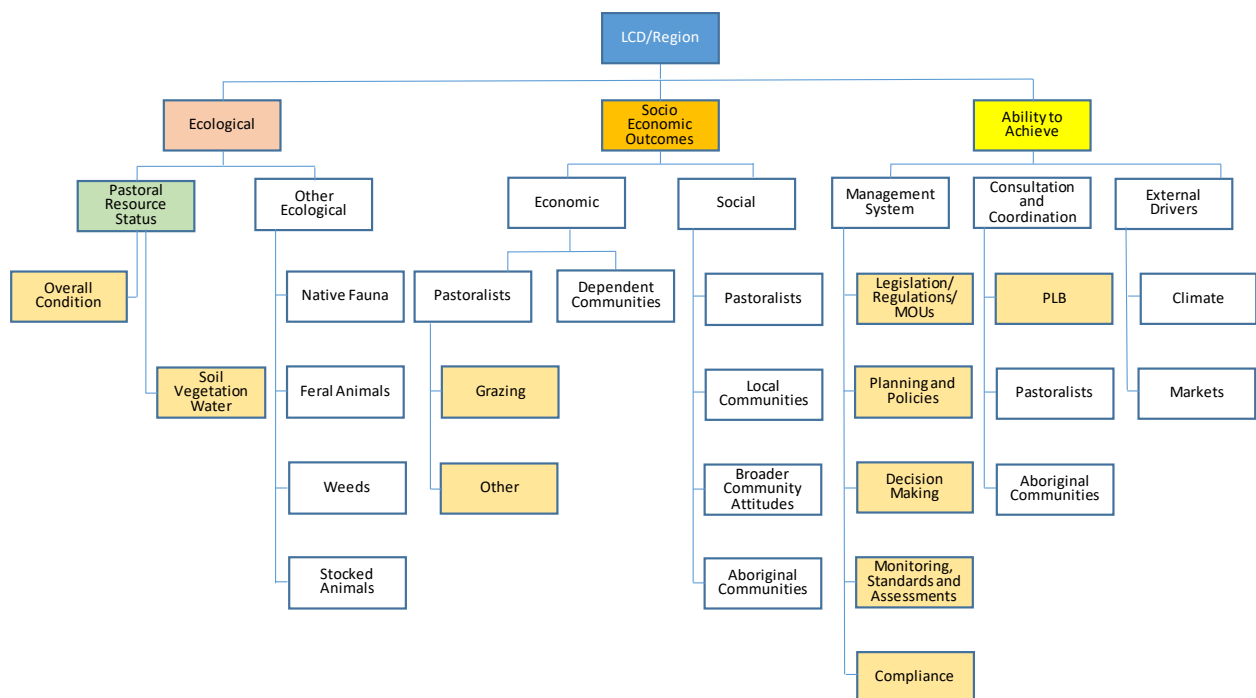
5.1 Strategic vision statement for the pastoral estate

Based on the above sets of legislative and policy requirements, the ISC developed the following ESD based strategic vision for the pastoral estate.

Management of Western Australia's pastoral lease resources leads to sustainable use of rangelands, supporting prosperous pastoral businesses, community wellbeing and biodiversity conservation for future generations.

5.2 Scope of issues to address

The generation of beneficial outcomes for the community from the management of pastoral leases requires consideration of many issues covering the full suite of ESD principles. As per the COAG (1992) definition of ESD, this involves explicit consideration of environmental, social, economic and governance outcomes expected by the community. Based on the suite of legislative and policy requirements outlined in Section 4, an ESD component tree which presents the overall scope of issues that require assessment, and potentially some level of action was developed (Figure 3).



Note: The coloured boxes correspond to the issues mentioned in OAG (2017).

Figure 3: Starting component tree for the regional assessment of the pastoral estate based on ecologically sustainable development objectives

This starting set of ESD components (issues) for the pastoral estate will be tailored for each of the Rangeland regions by adding or tuning issues specific to that region and deleting issues not relevant to the region. These refined set of regional component trees would then form the basis for undertaking a full ESD-based risk assessment in each of the regions which will determine the key risk issues that may require direct management by the relevant agencies and/or the leaseholders in that area.

Identifying these key regional risks will enable plans to be tailored for each region and also identify where there are consistent risk issues across regions that require state-wide action. Completing a case study of this approach is a project output of the land condition monitoring workstream.

5.2.1 Consolidated conceptual objectives (based on LA, SLC, BAM, AW Acts)

A key requirement of the pastoral lands reform project was to develop a 'practical (operational) outcome-based definition of ecologically sustainable development from which standards to assess acceptable land condition and performance can be developed to inform a robust compliance program'.

Importantly, while a key principle of ESD is for the environmental, economic, social and governance objectives all to be considered (Figure 3), the overarching requirement for all NRM systems is to maintain an acceptable ecological condition as this underpins all future development. Consequently, the environmental objective that was developed by the ISC and IRG for the pastoral estate will be the primary objective to be achieved.

Consistent with the overarching ESD vision for the rangelands, a consolidated conceptual environmental objective was developed based on the specific sections within the LA Act and the SLC Act that specify land condition and other broader 'environmental' management requirements (see Section 4).

Conceptual objectives were also identified for economic, social and governance outcomes that were based on the objectives developed within other ESD frameworks. These may be refined following the outcomes of regional level assessments.

Environmental objective

Maintain or improve overall land condition, including pastoral vegetation, soils and other attributes², at levels that ensure longer-term pastoral industry productivity and ecosystem function.

Economic objective

Maintain or increase the contribution of the pastoral industry to the state's economy.

Social objective

Maintain or increase contribution of the pastoral industry to community wellbeing at the regional (e.g. employment) and state-wide levels (e.g. animal welfare).

Governance objective

Implement effective legislation and management systems that cost-effectively deliver the objectives and services.

² The term 'other attributes' would include requirements under the *Animal Welfare Act 2002*, *BAM Act*, *EP Act* and *Conservation and Land Management Act 1984*.

6 Developing risk-based pastoral management

6.1 Risk-based decision-making

With each of the foundation elements for pastoral management clarified (political commitment, legal framework, clarity of responsibilities (Section 4), plus the vision, scope and conceptual objectives (Section 5), an effective and efficient risk-based management system for pastoral lands management can be developed.

The overall purpose of adopting a risk-based pastoral estate management approach is to improve acceptable outcomes across the suite of legislative and other requirements. This includes maintaining or improving overall land condition (including pastoral vegetation and soils) at levels that ensure longer-term productivity and ecosystem functions that meet overall community objectives.

A core component of this approach is by undertaking formal risk assessments (consequence x likelihood) to determine the adequacy of current management systems for each of the issues identified. Effective risk assessments require an established scope of what is to be managed, clarity on the objective(s) to be delivered (including what is considered as an acceptable level of performance to enable the development of standards), and a clear timeframe that will be used to assess the likelihood of a particular 'consequence' actually occurring (see ISO 2019; SA 2013 for full details).

The current focus for this edition of the Framework is to achieve acceptable land condition outcomes to meet the OAG requirements (2017). The same principles will be applied to assist achieve acceptable outcomes for the other ESD elements as outlined in Figure 3; these sections will be added to future editions of the Framework as it develops.

Having clarity on what is and is not acceptable performance is essential for both government and lessees as it benefits planning and appropriately focuses extension, research and development activities and resources.

6.1.1 Regional level assessment of risks

Generating good outcomes from the management of pastoral leases in addition to land condition requires proper consideration of each issue within the full suite of ESD principles and all legislative requirements as outlined in Section 4. To efficiently determine which additional elements may require increased management on pastoral leases, the first step is to develop a specific regional-level ESD component tree.

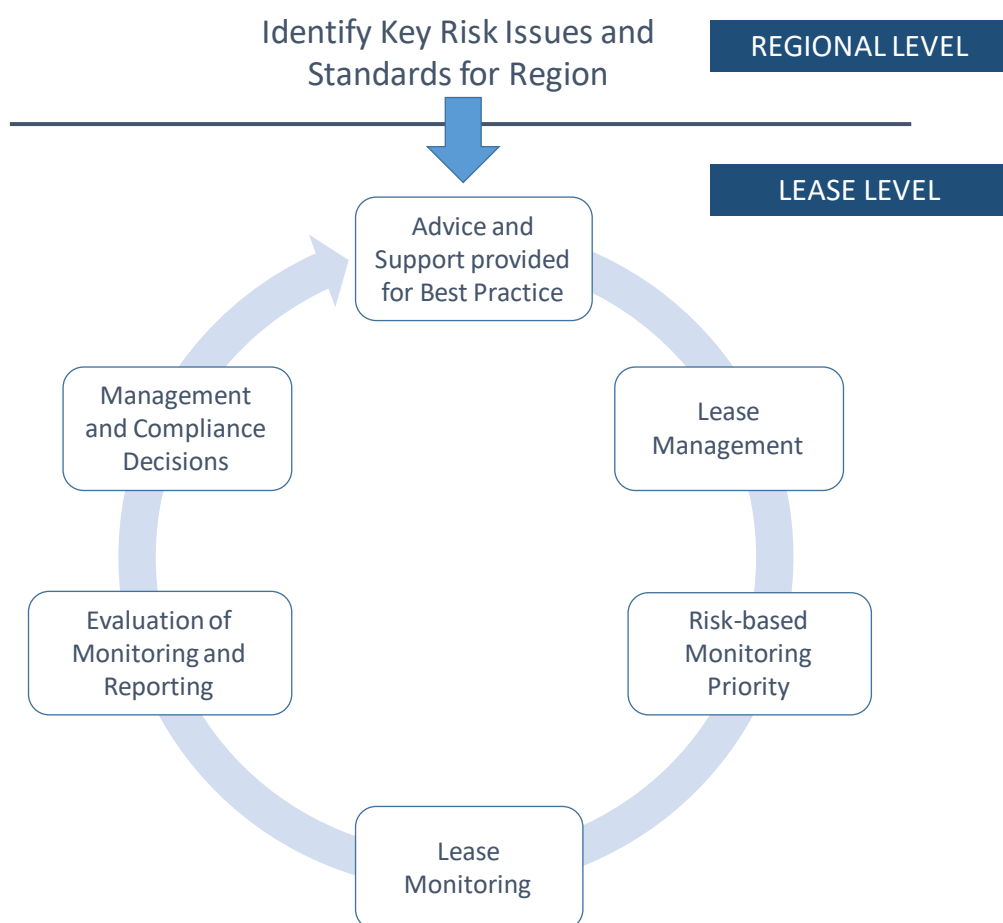
Regional-level stakeholder workshops will be undertaken to tailor the starting set of ESD components presented in Figure 3 by adding missing issues and removing (with justification) any issues not relevant for that region. A formal risk assessment for each identified element will then help determine the appropriate priority for each of these issues (see Appendix B for non-land condition risk assessment tables).

The risk assessments will determine which issues (in addition to land condition) are of sufficient risk to require the development of specific formal management systems. This would include the generation of clear regional standards for acceptable performance, the establishment of appropriate monitoring methods plus resolving any interactions with other competing components.

For each issue that is of sufficient risk that it requires formal management (which will include each of the relevant Acts outlined above), a risk management cycle as per Figure 4 will need to be developed. The following section outlines how this cycle has been developed for the management of land condition.

6.2 Risk-based pastoral management cycle

Based on the ISO31000 risk management standards outlined Figure 1, a specific risk-based cycle for the management of pastoral leases was developed (Figure 4). All the elements in this management cycle need to be undertaken in a coordinated and effective manner to achieve acceptable resource management outcomes. As outlined above, the development of lease-level requirements be informed by regional level assessments that identify the key issues and standards that will apply in each rangeland region.



Note, the land condition and monitoring workstream will be developing improvements to many of the components within this management cycle.

Figure 4: Risk-based pastoral land condition management cycle

6.2.1 Risk management cycle at the lease level (land condition)³

The management cycle outlined in Figure 4 has regular feedback loops at the lease level to ensure that activities on the lease that affect land condition are adjusted according to the prevailing environmental conditions and current performance against the land condition standards. The cycle includes 6 elements:

Advice and support for best practice: Information and advice will be provided to lessees regarding their land condition, relevant standards plus best management practices and options appropriate for their region.

Lease management: Lessees are expected to use best management practices to maintain and/or improve land condition to acceptable levels. Best practices will be encouraged through a suite of incentives such as the potential for the development of an accreditation/certification system, which may assist with obtaining grants or loans, or 'green tick' produce giving them premium market value and lease valuation.

Risk-based monitoring priority: The frequency and intensity of monitoring on individual leases will be determined with a risk-based approach utilising historic land monitoring data, stock return data, recent seasonal conditions, any accreditation or certifications and local intelligence. Input from land managers will be sought in this process.

Lease monitoring: The level of direct monitoring will be based on outputs of the risk assessment process. Leases with higher risks may be directly monitored more frequently, using an appropriate combination of data from remote sensing and on-ground surveys.

Lease level evaluation and reporting: Assessments of monitoring data against regional condition standards will be undertaken with the outcomes reported to lessees, the PLB and the Commissioner. Regional overviews will be provided to the State Government through annual reporting.

Management and compliance decisions: Evaluation of the risk status of leases will include current condition status combined with current or proposed management actions. The evaluation outcomes will form the basis for any decisions by the PLB and the Commissioner to fulfil the requirements of the LA Act, the SLC Act and other relevant requirements.

6.2.2 What this approach will mean for each lessee

Over the coming years this approach will result in:

- improved lease-level reporting and incentives for developing explicit lease management plans for land condition
- clearer understanding of all important issues and expectations, which will enable a no surprises compliance approach, with regulatory action occurring as the last resort
- facilitating successful entry and certification by third party ESG accreditation systems.

³ Similar risk-based cycles will be developed for other issues requiring full risk management

6.3 Developing land condition conceptual standards

A key part of beginning the implementation of risk-based decision-making for land condition on pastoral leases is to develop conceptual standards that clearly define the types and levels of impact that separate acceptable from unacceptable performance. These conceptual standards will provide the basis for establishing robust and consistent ways of assessing the condition, productivity and ecosystem status in each region and therefore the determination of current land management effectiveness.

To determine these conceptual standards, it was recognised that the assessment of pastoral land condition must accommodate the intersection between the land condition objectives contained within both the LA Act and the SLC Act. Given this intersection, a three-category system of conceptual standards was developed for land condition which separates acceptable, suboptimal and unacceptable condition (see Figure 5).

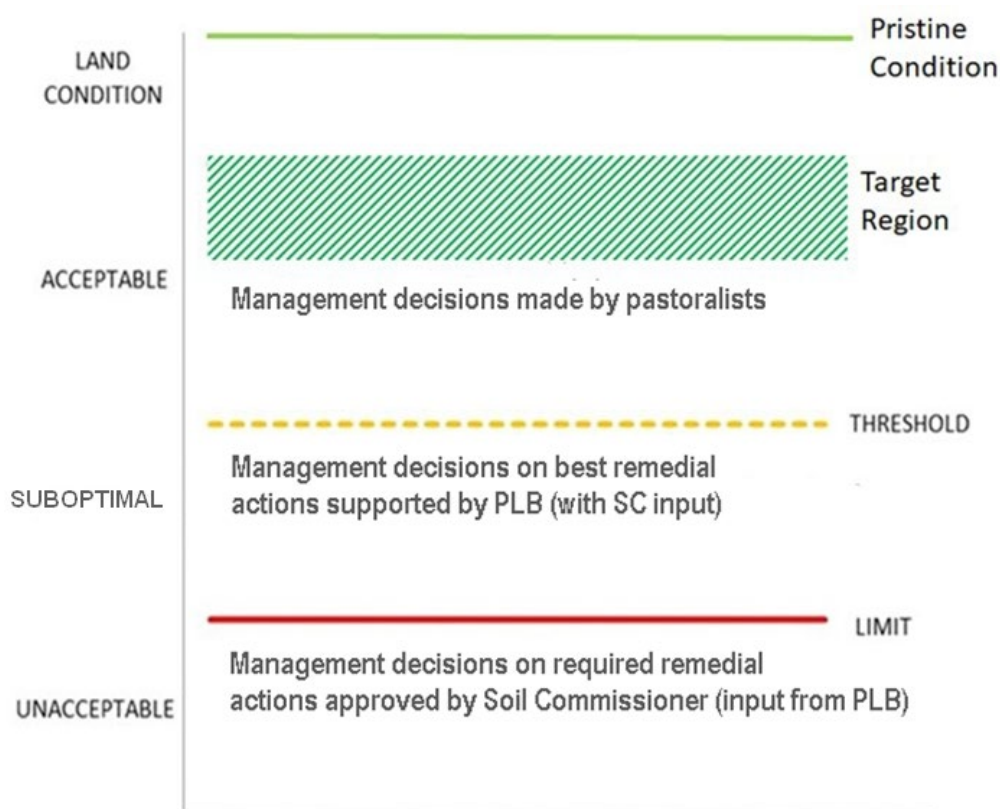


Figure 5: Description of the conceptual standards – target, threshold and limits for land condition that separate acceptable, suboptimal and unacceptable performance and where the decision-making responsibility for actions reside

This three-category system clearly identifies when the current land condition, or the likely future condition of a pastoral lease, would not meet the requirements of the LA Act and/or the SLC Act and therefore when primary land management decisions remain with the lessee or shift to become the responsibility of the PLB or the Commissioner.

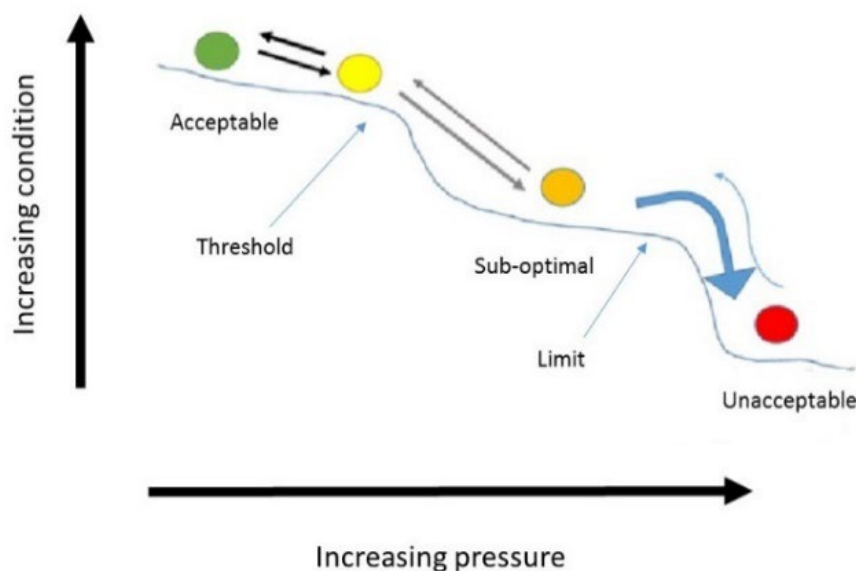
As outlined above, the overall environmental objective for sustainable pastoral management is to 'Maintain or improve land condition (including pastoral vegetation, soils and other attributes) at levels that ensure longer-term pastoral industry productivity and ecosystem function'. This objective is consistent with the definition of rangelands

health as defined by the National Research Council (1994) which is ‘The degree to which the integrity of the soil, vegetation as well as the ecological processes of rangelands ecosystems are balanced and sustained.’

The determination of separation points between the three land condition categories is largely based on the ability and time needed to recover from a degraded condition and/or the likelihood of a permanent transition to a different, usually less productive, state.

It is generally accepted that recovery from different levels of land degradation is not uniform across all pasture types and that it is also much easier to degrade a pasture than for it to recover. For most landscapes, it is much harder (and often impossible) to return to an acceptable condition of the original pasture type from a highly degraded state, especially if there has been significant soil loss (Figure 6).

In addition, some landscape systems may not follow the traditional succession model (as depicted by the rolling ball model), whereby just reducing grazing pressure or other threats to this landscape will result in its automatic return to the original ‘climax’ state pasture (Westoby et al. 1989). For these ‘non’ equilibrium systems, they may transition to a number of ‘alternative vegetation states’ with these altered states often persisting for some time. They may only transition to an ‘improved’ state through a combination of circumstances including reduced grazing, plus a run of high rainfall years or fire events.



Note: The thickness of the arrows reflects the relative ease of movement in that direction.

Sources: Briske et al. (2005); MLA (2018).

Figure 6: Modified from the ‘rolling ball’ (equilibrium) model of land condition

These recovery constraints must be considered when determining what is acceptable risk to maintain appropriate land condition, and where land condition has moved to an alternative state, what is the expected time frame for recovery. It is imperative that the condition of pastures is managed at levels that have the greatest resilience in terms of

maintaining the productive resource base and minimising the likelihood of transitions to less productive states. The land condition standards, therefore, need to be set sufficiently above the state transition points to ensure there is time to take management actions to prevent condition degrading to the unacceptable level.

6.3.1 Conceptual standards and attributes for land condition

There are few explicit quantitative standards developed at scales that would be relevant for use in assessing the land condition status of pastoral leases within Western Australia. There are, however, a series of land condition assessments and surveys for the rangelands in WA and for other areas of the world, plus several pastoral/rangelands monitoring guides available for use as a solid foundation for their development.

The landscape attributes and the potential indicators that formed the basis of each of the conceptual standards of land condition were adapted from technical reports generated for monitoring and assessing rangelands in Australia (DPIRD rangelands webpages), the United States (Herrick et al. 2017; Pellant et al. 2020) and Africa (Riginos and Herrick 2010; Liniger et al. 2011; Al-bukhari et al. 2018).

The key attributes used are:

- vegetation condition – density and quality of desirable perennial species within each key pasture type; measured using remote sensing and on-ground monitoring
- vegetation cover – level of total vegetation cover; measured using remote sensing
- biotic integrity – invasive plant cover and density. These will be measured using both remote sensing and on-ground monitoring
- soil stability – area of bare ground, presence of and potential for water erosion; measured using remote sensing and on-ground monitoring
- recovery – the ability and ease of improving condition status (Figure 6); estimated from empirical evidence
- productivity – the current carrying capacity (CCC) as a percentage of the estimated potential carrying capacity (PCC) of key pastures; estimated from industry, expert and research knowledge.

A summary of the attributes used within each of the three conceptual standards are outlined in Table 1. The assessment of current condition status may use any combination of these land-condition attributes.

To assess compliance with the SLC Act in relation to land degradation, the standards will use the suite of vegetation and soil attributes. To assess compliance with the land condition components of the LA Act, in addition to using vegetation and soil attributes, the standards will assess the current level of productivity (current carrying capacity compared to potential carrying capacity) as an indicator of whether the lease is being operated to its best advantage as a pastoral property and if it is an economically viable and ecologically sustainable pastoral business unit.

Table 1: Summary of attributes in the conceptual standards for land condition for the pastoral industry in WA

Acceptable (Land condition above threshold – Compliant with LA Act and SLC Act)
<ul style="list-style-type: none"> Any declines in land condition of key pastures (the most pastorally important pasture types within a particular region) from the target range (Figure 7) are minor and temporary, easy to restore with conservative stock management, or targeted spelling and favourable seasons. In this state, 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)
<ul style="list-style-type: none"> 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)
<ul style="list-style-type: none"> 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.

Note: Full descriptions of criteria are in Appendix C.

6.3.2 Implications for pastoral lease management

The decision-making processes and expected actions of lessees and regulatory bodies will depend on the current and likely future condition status of a lease (Figure 6).

Management implications of different land condition categories:

- **Acceptable:** above the regional threshold – the lessee determines their pastoral activities if these meet all other lease requirements. Assistance from the PLB, the Commissioner or an external provider may be available to help the lessee keep their lease in this state
- **Suboptimal:** below the regional threshold and above the limit – the activities and management of the lease are collectively reviewed by the lessee and the PLB with input from the Commissioner to improve land management effectiveness
- **Unacceptable:** below the regional limit – rehabilitation outcomes to be set by the Commissioner, the necessary remedial actions undertaken by lessees would need to be approved by the Commissioner (potentially with input from PLB).

6.3.3 Regional differences in standards

Given the significant regional variations in landscapes, climate, and their pastures, they are likely to have different levels and types of degradations associated with the condition standards. The thresholds and limits will therefore need to be specifically tailored for each region based on their landscape properties, pasture types and climate.

The DPIRD Land Condition Workstream is developing and documenting the regional-level standards for each rangeland region (e.g. Fletcher et al. 2022). These reports will include the performance thresholds and limits for each of the key pastures in that region, plus outline the scientific basis for setting these specific standards. The regional performance settings and criteria may be refined through time as more data becomes available.

7 Overview of land condition assessment and compliance system

A critical part of the risk-based management system is the monitoring, assessment and compliance system that is to be used to ensure the risk levels for land condition and other related attributes of the lease remain at acceptable levels.

The pastoral lands monitoring, assessment and compliance systems to be applied must also reflect the size and diversity of landscapes across the pastoral rangelands in WA. It will also need to reflect the changes in lease level monitoring that have occurred over the past decades and the prospect of new monitoring technologies. The overall risk-based approach will involve monitoring and assessment processes at two geographic scales.

7.1 Regional-level monitoring and standards

To ensure that robust and efficient assessments are undertaken, the most appropriate spatial unit used to start development of the regional standards was determined to be at rangelands region scale. To date, five separate regions have been identified – West Kimberley, East/North Kimberley, Pilbara, Nullarbor, and Southern Rangelands. It is likely that the Southern Rangelands will be split into the Gascoyne and Goldfields, further subdivisions or joining of regions will occur if necessary.

Regional monitoring and standards criteria specific for each of these regions is currently being developed or has been planned. This will include determining the specific levels and types of degradation (vegetation condition, and soil loss and erosion) associated with the key pasture types in each of these regions that best fits with the three conceptual condition categories as outlined in Table 1.

Once completed, the land condition status of leases in each of these regions will form the basis of reporting to parliament on the overall status for the rangelands.

7.2 Lease-level monitoring and assessment

Given the relative costs of undertaking a comprehensive land-based inspection of a lease, and consistent with the risk-based approach adopted within the Framework, the level of land condition assessment undertaken for each lease/station will be determined each year in a hierarchical, 'decision tree' manner based on 'risk' (Figure 7).

The four-level decision tree process begins with an annual desk-top assessment of all leases to identify the highest priority leases within each region. The requirement to move to the next level of assessment, monitoring, compliance, and management intervention only occurs where necessary.

Importantly, regulatory action by the Commissioner only occurs at the last step.

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

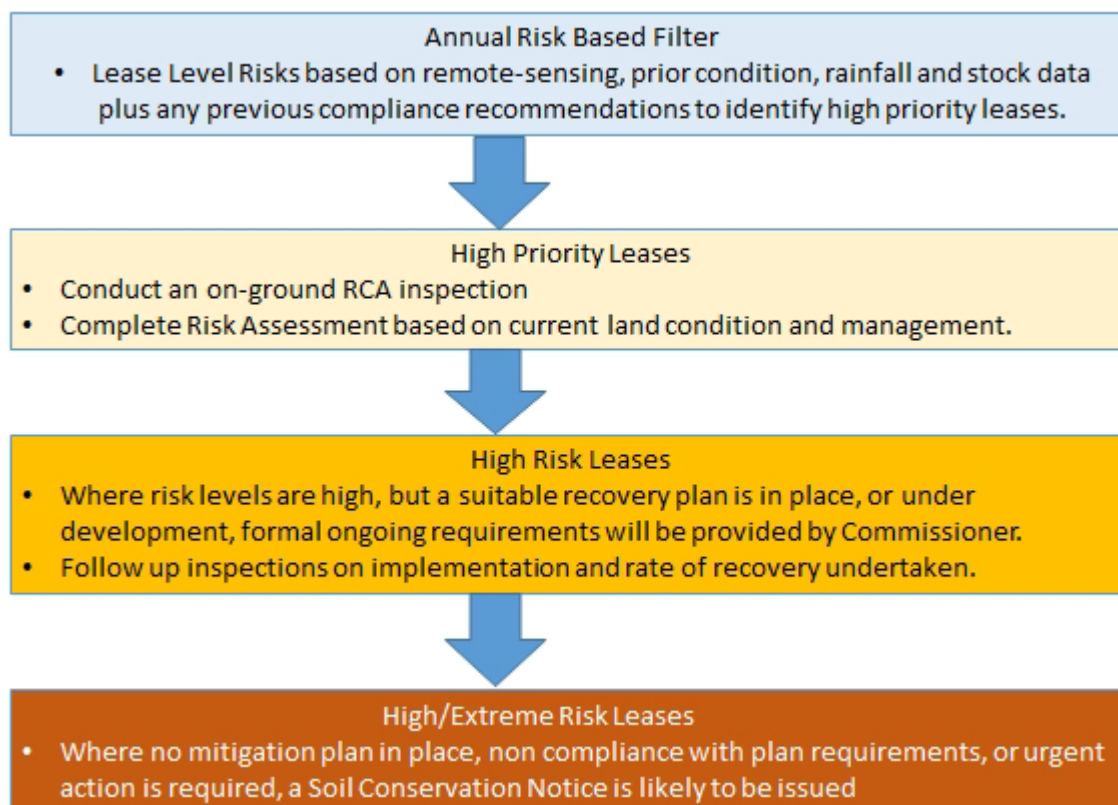


Figure 7: An outline of the decision tree process for determining the level of monitoring and compliance activities required for lease-level risk assessments, management plan requirements and potential enforcement actions

To expand on Figure 7, the four levels involve:

1. Annual risk-based assessment

- i. Relative risk levels will be calculated for all leases within each region using historic information on condition, any previous DPIRD or PLB recommendations, remote sensed data sources, annually submitted station information and the length of time since a formal Rangeland Condition Assessment (RCA) has been completed on the lease and other regional considerations including assessing leases to assist develop regional standards.
- ii. 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 identified lessees.

2. High-priority lease risk assessment (RCA)

- iii. To determine if the lessee of a high priority lease is sufficiently dealing with the land condition risks, a formal land-based RCA will be completed.
- iv. If the RCA assessment of land condition status combined with the evaluation of 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 be forwarded to the PLB for noting.

- v. If the RCA finds the condition is or based on current land management effectiveness is 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

- vi. 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.
- vii. Where the condition status is above the limit but the risk of further decline below this level is high given current land management effectiveness, the Commissioner and 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

- viii. 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 condition 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 for the specific parcels of land involved 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.

7.3 Land management effectiveness

Land management effectiveness is defined as the pastoral management behaviours that prevent or ameliorate land degradation that are undertaken to achieve 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 (Figure 8).

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?

More detailed descriptions of each level of land management effectiveness for these criteria is presented in Appendix D. These criteria are consistent with the *Guidelines for good pastoral land management* developed by DPLH (2020). They are also consistent with the lease condition requirements under the LA Act for pastoral lease management duties, including:

- working the land under the lease to its best advantage as a pastoral property
- using best pastoral and environmental management practice
- maintaining indigenous pasture to the satisfaction of the PLB
- not sowing or cultivation non-indigenous pasture except under a permit
- controlling declared weeds.

The above set of criteria are also consistent with what would be assessed by third party certification/accreditation schemes. While there is currently no formally recognised management certification available for pastoralists, it is expected that being able to clearly demonstrate sustainable management practices may be of considerable value to leaseholders in the future. Having such accreditation could result in banks lowering their assessment of leaseholder's risk, and therefore interest rates, and the extent to which leaseholders may carry debt.

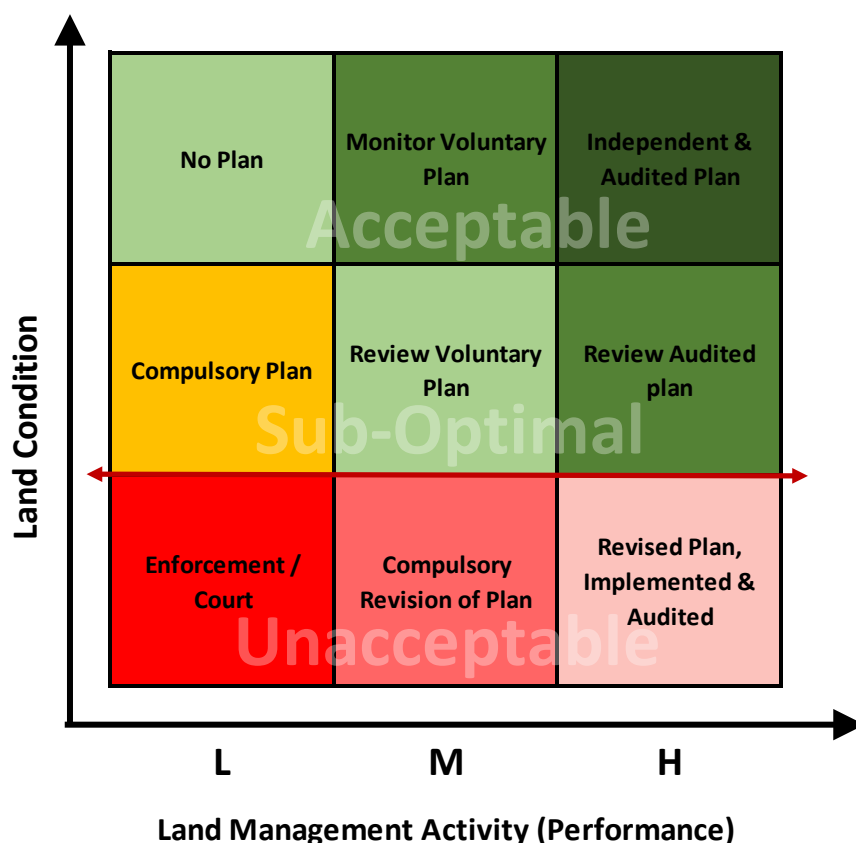
This will also help to solve information asymmetries between lenders and borrowers such that lessees will be less likely to set unrealistic grazing regimes to service loans issued in expectation of business performances beyond the land's sustainable limits.

7.4 Risk-based lease evaluation and decision matrix for land condition compliance

The land degradation risk level for a lease is determined using the consequence by likelihood risk analysis approach (ISO 2018; ISO 2019). This is achieved by combining the condition standards (Figure 5; Table 1), the lease assessment processes, and an evaluation of land management practices (Appendix C), enables a conceptual risk-based decision matrix to be generated (Figure 8).

The management practices in the upper right of the matrix (acceptable land condition and a high level of land management effectiveness) are likely to maintain acceptable land condition, result in good animal welfare, and the potential to generate market-based rewards through branding landscape sustainability credentials.

This type of approach was adopted for the fishing industry through the Marine Stewardship Certification (MSC) schemes and, more recently, through FutureBeef Best Practice (FutureBeef n.d.). These practices could also evolve into the industry codes of practice that are common in intensive animal industries, in which agreed industry standards meet regulatory and industry objectives in the most cost-effective ways.



Notes:

- 1 Colour indicates the risk level – green is lowest risk; red is highest risk.
- 2 See Appendix C for land condition standards and Appendix D for land management effectiveness descriptions.

Figure 8: Risk-based decision matrix for lease condition management

8 Detailed description of assessment methods

8.1 Regional land condition standards

8.1.1 Indicative assessment template

To assist in the development of land condition standards for each region, the following template was developed to initiate the collection of data:

- Name of region
- Main attributes of the region. For example: geography; rainfall and other climatic factors; landscapes; vegetation; soil types and their vulnerabilities; overall relative productivity; resilience
- Summary of pastoral history, for example, when pastoralism began; what has been stocked; historic pastoral land management effectiveness
- Primary pastoral landscapes and pasture types. The key pasture types for the region that are most vulnerable to degradation from pastoral activities; their relative vulnerabilities and key threats; and when degradation would be in breach of the SLC Act
- History of good, fair and poor condition for key pastures in the region. The history helps to refine the most important elements determining acceptable management performance
- Current WARMS condition will provide an overall pastoral condition for the rangeland region, which can be used to compare against lease-level condition
- Number of pastoral leases with notable hazards, or some form of risk management. This information will help identify risks and priorities for the region and help set future standards.

This template will be updated after the completion of each set of land condition standards.

8.1.2 Indicative threshold and limit levels for different pasture types

Indicative examples of the types of threshold and limit levels that were used to initiate the quantitative assessment of pasture condition and erosion for the different types of pastures are presented in Table 2.

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

This set of indicative levels will be updated after the completion of each land condition standards study.

Table 2: Vegetation condition and erosion risk standards for Region X, a region of high pastoral value

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%

8.2 Annual land monitoring program

8.2.1 Pastoral lease condition

Current land condition monitoring

The OAG (2017) noted that implementing comprehensive on-ground monitoring of lease condition was possible but resource-intensive. A cost-effective lease-level monitoring system is being developed by DPIRD as part of the land condition monitoring workstream.

To assess land condition, WA currently uses qualitative based assessments using the Pasture condition guides that have been developed for each pastoral region (e.g. Ryan et al. 2013). This qualitative approach is consistent with that used in other Australian rangelands regions which also have similar qualitative guides and share many pasture types and pasture ratings (e.g. Phelps 2012).

Formal on-ground Rangeland condition assessments (RCA) procedure for monitoring individual pastoral leases/stations in WA involves on-ground surveys that make qualitative assessments of pasture and erosion condition at multiple (>100) assessment sites across the lease/station. Each site is rated as excellent, good, fair, poor or very poor based on the guides with these condition ratings condensed within the RCA report into three levels: good, fair and poor. These RCA reports can include assessments of land condition that are made at the lease, land system, pasture type or paddock level.

Future land condition monitoring

To meet the enhanced monitoring and assessment requirements of the Framework, the system will outline the most appropriate technologies and procedures for regular lease monitoring and targeted lease inspections based on annual risk assessment, regional condition standards, and lease-level and regional-level reporting. A series of complementary quantitative measures of pasture condition are being developed. These include:

- Increased use of satellite-derived measures of fractional cover (percentage of bare ground and evenness of vegetation cover), vegetation indices and tree canopy cover (see Holmes and Ramzi 2022).
- Collection of on-ground data to calibrate and validate fractional cover data to increase the accuracy and use of remote data for estimating land condition.
- Shifting to the use of robust, on-ground quantitative measurements of pasture condition based on the density, population demography and vigour of indicator species within each key pasture. Once calibrated and tested, these quantitative measures will ultimately replace the current qualitative assessments that determine good, fair and poor condition reported in RCAs.

Each of these monitoring enhancements are the subject of separate studies, which, when completed, will allow increased use of quantitative measurements of site-level pasture condition to assess the status of each key pasture. Until these studies are completed, qualitative condition assessment methods will continue to be applied.

8.3 Annual risk-based lease assessment

The OAG stated that DPIRD's target of undertaking 20 on-ground inspections of leases each year, if fully implemented, would partly address the Commissioner's recommendations (OAG 2017). To determine which leases are selected for on-ground inspections, an annual risk assessment process is undertaken.

Within each of the rangeland regions, leases considered most at risk of land degradation are identified and ranked in order using weighted measures that include:

- the station condition as determined by the most recent on-ground RCA 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.

DPLH, DPIRD and the Commissioner will consult on the at-risk stations to produce a priority list for further investigation.

Other stations 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 generate data to complement the development of condition standards for the region.

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

8.4 Lease assessment process

8.4.1 Land condition

An RCA report provides the on-ground information that will be combined with other relevant data for use by the Commissioner to conduct a formal risk assessment of the land condition management for a lease using a weight-of-evidence approach based on ISO 31000 (ISO 2018; Fletcher 2015).

The risk matrix in Table 3 uses the assessment of current land condition status based on the RCA as a measure of the potential future consequence level. This is combined with an assessment of the land management effectiveness as the indicator of likely condition trajectory. This is based on the supposition that where land management effectiveness is high this reduces the risk of decline from acceptable land condition levels and/or increases the likelihood that land condition will improve from unacceptable levels with the opposite also likely where current land management effectiveness is low.

Based on the available information including that supplied by lease holders, the expert opinions of DPIRD staff and the Commissioner, the most appropriate combination of consequence and likelihood levels is selected. The justification for selections must be consistent and defensible which is assisted by using the set of land management effectiveness criteria presented in Appendix D.

An important benefit of this method is that it not only assesses the current land condition status but also the likelihood of future condition given the current lease management. This approach assists the PLB and Commissioner determine when to take pre-emptive actions for situations where land condition is considered likely to fall below the threshold or the limit. Similarly, this approach also enables land management effectiveness to be formally acknowledged where suitable remedial actions have already been taken by the lessee which reduces the need for imposing additional compliance actions.

For example, a lease may be assessed as high risk even if its condition is above the limit because with current lease operations, condition is likely to decline below the limit. Equally, a lease may be assessed as medium risk even if it is currently below the limit because the current management plan is generating an appropriate rate of recovery.

Table 3: Risk levels from the interaction of land condition status and land management effectiveness

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

The three worked examples in the case studies presented in Appendix E show how the estimated risk levels (very low to extreme) are generated from the interaction of land condition status and land management effectiveness.

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.

8.5 Land condition risk level and regulatory response

Based on the risk levels in Table 3, the appropriate regulatory response for pastoral management can be determined (Table 4).

Table 4: Land degradation risk categories, management responses and primary decision maker

Land degradation 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	Lessee works with PLB to improve management, or continues implementing an approved recovery program	PLB, with input from the Commissioner and lessee, develops and ensures implementation of suitable management improvements	Commissioner provides input to PLB on condition trends and management options, or monitors approved recovery program
High	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	Commissioner specifies requirements directly to lessee, through the PLB or by issuing an SCN
Extreme	Lessee is required to achieve specific condition outcomes issued by the Commissioner; additional notices or actions may be issued by the PLB	PLB may issue a notice to destock or take other actions, issue a default notice, and potentially recommend lease forfeiture	Commissioner issues an SCN stating required mitigation actions and improvements to be achieved

8.6 Assessing the risk for other Acts and ESD requirements

The same risk-based approach can be adopted to assess performance against any other standards or Act requirements that may be relevant to an individual lease.

Initial consequence and likelihood tables for use assessing the risks associated with other ESD objectives are in Appendix B.

Appendix A Relevant legislative statements

LA Act

LA Act objectives for pastoral land management, as reflected in the statement of the lessee's duties, are:

'The lessee must use methods of best pastoral and environmental management practice, appropriate to the area where the land is situated, for the management of stock and for the management, conservation and regeneration of pasture for grazing.

The lessee must maintain the indigenous pasture and other vegetation on the land under the lease to the satisfaction of the Board. In satisfying itself for the purposes of subsection (4), the Board must seek and have regard to the advice and recommendations of the Soil Commissioner on the matter.

A pastoral lessee must control declared pests on the land under the lease in compliance with the *Biosecurity and Agriculture Management Act 2007* and to the satisfaction of the Board.'

SLC Act

Relevant statements for land condition

To attain and maintain an appropriate level of land use and stability of that land in perpetuity and includes the use of measures to prevent or mitigate the effects of land degradation (compiled from SLC Act, section 4).

The prevention and mitigation of land degradation, where land degradation includes:

- (i) soil erosion, salinity, eutrophication and flooding (4a)
- (ii) the removal or deterioration of natural or introduced vegetation (4b)

that may be detrimental to the present or future use of land.

Regarding Crown lands

'The Commissioner may by writing addressed to the appropriate officer advise any Government department or public authority as to the alienation, disposal, occupation, care or use of any Crown lands in any case where the Commissioner considers that the matter of land degradation or soil conservation is relevant in respect of such alienation, disposal, occupation, care or use.' (SLC Act section 19(1)).

'Any Government department or public authority may refer to the Commissioner for investigation and report any question as to the appropriate use of any Crown land having regard to considerations of land degradation and soil conservation.' (SLC Act section 19(3)).

'Every Government department shall upon a request by the Commissioner in writing addressed to the appropriate officer make available to the Commissioner any records of measures or operations for the prevention or mitigation of land degradation or any reports as to land degradation, soil conservation or the utilisation of land whether undertaken, made or received before or after the commencement of this Act.' (SLC Act section 19(4)).

Regarding leases

'Where the Commissioner is satisfied that compliance with any covenant, condition, term or provision of any lease granted under the *Land Administration Act 1997* or any mining tenement granted under the Mining Act 1978 would tend to cause land degradation on any land he may so advise the Minister responsible for the particular Act.' (SLC Act section 19A(1)).

Regarding Land Conservation Districts (LCD)

The Governor may make regulations for LCDs in respect of any land of any act or thing which may be likely to prevent or mitigate land degradation or promote soil conservation and for prohibiting the doing on or in respect of any such land of any act or thing which may be likely to facilitate land degradation (compiled from SLC Act section 22).

Appendix B Risk assessment tables (non-land condition)

The ISO31000 risk standard defines risk as ‘the effect of uncertainty on objectives’. The risk is calculated from the product of likelihood (Table B1) and consequence (Tables B2 to B7). This must be calculated using the likelihood of a specific consequence actually occurring within a specified timeframe.

Table B1: Likelihood of a specific consequence level occurring within the timeframe of the assessment profile

Likelihood (rating)	Likelihood descriptor
Remote (1)	May occur, but only in exceptional circumstances in the timeframe (indicative probability <10%)
Possible (2)	Possible occurrence in the timeframe, but requiring specific circumstances to occur (indicative probability of 10–50%)
Likely (3)	More likely than not to occur within the timeframe (indicative probability of 51–100%)

Table B2: Other environmental consequences

Risk level	Environmental consequences
Minor (1)	Measurable but minimal negative impacts that are acceptable and easily meet the objective
Moderate (2)	Maximum acceptable level of impact that would still meet the objective
Major (3)	Above acceptable level of impact. Broad or long-term negative effects on the objective, which may no longer be met. Restoration may not be achieved within a short to moderate timeframe

Table B3: Economic consequences

Level	Economic consequences
Minor (1)	Potentially measurable, but no material impact on the economic pathways for the pastoral industry or the community
Moderate (2)	A level of reduction in the economic generation for leases across the region or a larger reduction within a part of the region with some noticeable level of effect on dependent communities
Major (3)	Economic generation of pastoral production in the region has significantly decreased and this will have clear flow-on effects to other parts of the community. May result in some level of political intervention

Table B4: Social structure consequences (local – regional)

Level	Social consequences
Minor (1)	Potentially measurable within the community that directly interacts with the pastoral industry
Moderate (2)	Some direct impacts on regional social structures but not to the point where local communities are threatened or social dislocations will occur

Level	Social consequences
Major (3)	Severe impacts on social structures in the region, at least at a local level

Table B5: Political consequences (statewide)

Level	Social consequences
Minor (1)	Broader community has minor concerns about the pastoral industry. Some communications to the relevant Minister may be submitted
Moderate (2)	Direct public concerns, moderate news profile and direct Ministerial involvement is expected
Major (3)	High level of public concern, major impact and news profile, potential third-party actions and significant Ministerial involvement occurs

Table B6: Social – welfare, occupational safety and health consequences (pastoralists)

Level	Social consequences
Minor (1)	Pastoralist needs minor medical or psychological treatment, occasional visit to a professional, less than a week off pastoral lease work
Moderate (2)	Pastoralist needs hospitalisation or an intensive and extended treatment period for recovery
Major (3)	Pastoralist sustains serious or extensive injuries, disease, permanent disability or death

Table B7: Governance consequences

Level	Governance consequences
Minor (1)	Governance system will deliver most services and achieve most objectives in a reliable manner, some delivered inefficiently
Moderate (2)	Governance system not reliable in delivering services or achieving all objectives, or can only do so inefficiently
Major (3)	Governance system does not deliver many services or achieve many objectives and others are unreliable or inefficient

Appendix C Full description of conceptual standards

Table C1: Description of conceptual standards for pastoral land condition in WA

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	<p>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.</p> <p>Vegetation cover – the level of total vegetation cover, given seasonal conditions, is at or above the level expected of pastures in good condition</p> <p>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.</p> <p>Recovery – from condition change with this status, is likely to occur with minor management and without mechanical intervention.</p> <p>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.</p> <p>Management implications – this condition status on a pastoral lease would not be in breach of the LA Act or SLC Act</p>
Suboptimal	<p>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.</p> <p>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</p> <p>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.</p> <p>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.</p> <p>Productivity – the CCC is 50–70% of the PCC but this value can vary according to region or pasture type.</p>

Condition status	Attributes and conceptual standards to determine pastoral land status
	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 C1 (continued): Full description of conceptual standards for pastoral land condition in WA

Condition status	Attributes and conceptual standards to determine pastoral land status
Unacceptable	<p>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</p> <p>Vegetation cover – the level of total vegetation cover, given seasonal conditions, is at the level expected of pastures in poor condition</p> <p>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.</p> <p>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</p> <p>Productivity – the CCC is less than 50% of the PCC but this value can vary according to region or pasture type.</p> <p>Management implications – this condition status on a pastoral lease would be in breach of the LA Act and the SLC Act</p>

Appendix D Full description of land management effectiveness

Table D1: 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 $1.5 \times$ CCC	Stocking rate is more than CCC and less than $1.5 \times$ 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 D2: 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 E Fictitious case studies using risk evaluation matrix

The following 3 case studies show how the risk-based management system is applied for different levels of land condition and management.

Fictitious scenario 1: Acceptable condition and voluntary management plan

Example name: Good-O Downs Lease

Location	Pastoral lease area	Potential carrying capacity
Pilbara	225,911 ha	3,500 AE

AE = animal equivalent

Background

Good-O Downs is family owned. Management takes a long-term perspective as evidenced by intergenerational ownership: the next generation plans to take over the lease. The lease originally ran sheep, changing to cattle in the 1980s. Pasture types on the lease are a mix of grassland and shrubland. Infrastructure is of a high standard.

Mining exploration (particularly clearing for seismic lines and drilling access) has caused some erosion and altered the hydration of some areas.

Summer rainfall has increased across the lease.

Status

Condition

The previous RCA found 80% of the lease was in good condition, 10% in fair condition and 10% in poor condition, which is slightly better than the 2004 regional averages of 77% good, 11% fair and 12% poor. Much of the existing degradation on the lease is historical and is typical of high sheep numbers in the past. Land in poor condition is mostly the more productive river frontages and so has a disproportionate impact on the productive capacity of the lease.

The most recent RCA found that the land condition on the lease has been largely stable, though there was a decrease in land in good condition (72%), with 20% in fair condition and 8% in poor condition (changes +/- 5% are considered within the error range used in the assessment method). The decrease in land in good condition is attributed to greater use of less productive pastures that were largely unused in the past.

Comparison to standards

The proportional values are all consistent with the lease being in better condition than the thresholds for this LCD (>60% in good condition and <10% in poor condition).

Management

The lessee has a voluntary management plan (not independently certified) that includes these elements:

- fencing river frontage country to distribute grazing onto less productive pastures and allow seasonal spelling
- installing new water points to reduce stock numbers per water point, promote better water usage across the lease, control feral and native animal access to water and, in combination with monitored trap yards, promote low-stress stock handling
- strategic burning of spinifex, and providing supplements to facilitate grazing of these pasture types
- managing country to ensure vegetation cover and seed bank are maintained across seasons
- ongoing track maintenance to reduce water erosion by installing bunds
- although average stock numbers have increased on the lease over the last 20 years, the long-term average stocking rate does not exceed PCC.
- rigorously managing the herd to improve genetics, wean calves, remove older animals and maximise calving rates resulting in increased turn-off per AE
- ensuring that stock are removed before the available groundcover and feed on offer lead to a drop in animal condition
- providing access to grazing land in the northern wheatbelt to finish animals and reduce stock numbers on the lease during dry periods
- using a drought management strategy that includes critical dates, culling and radical weaning strategies defined by the severity of drought
- being a member of the local Recognised Biosecurity Group and actively controlling introduced pest species.

Risk evaluation considerations

Although the percentage of land in good condition has decreased, there is no need to take regulatory action because the lessee has successfully improved areas with historical degradation, uses best management practices, and land condition on this lease is above the regional averages.

If the decline in condition continues (as measured via the regular DPIRD monitoring program), the lessee may be asked to review management of the land in good condition.

The remediation of country degraded because of mining exploration activity is constrained by the financial burden this places on the family. The fact that the lessees are willing to take on this burden is viewed positively in any assessment of their management approach.

Compliance history

This lease has not been subject to compliance actions in the last 20 years.

Risk evaluation outcome

Based on the risk evaluation, the land condition is currently considered acceptable (Figure E1). The lessee is already undertaking sufficient voluntary management arrangements that will maintain or improve land condition. It is recommended that a direct review is not undertaken within 5 years. The monitoring and compliance approach for Good-O Downs Lease is in Table E1.

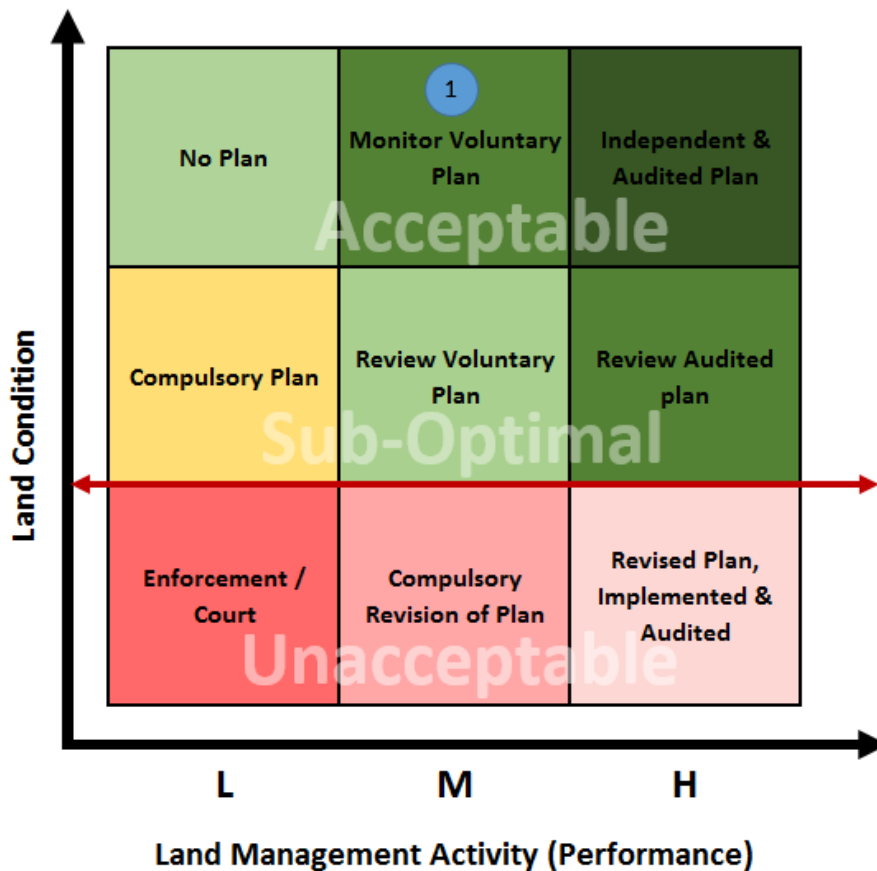


Figure E1: Placement of Good-O Downs Lease (blue dot) in the risk evaluation matrix

Table E1: Monitoring and compliance approach for Good-O Downs

Current approach	Proposed approach (determined by lessee)
Monitoring	
Regular monitoring RCAs finished in 2009. The 2019 RCA was done in response to the lease being identified as being at risk of degradation, resulting in a compliance inspection Before 2018, DPIRD sent reports to the PLB highlighting leases or areas in poor condition. Experience suggests these reports have not had any positive effect on improving rangeland condition	Regular monitoring of land condition by a mix of remote and on-ground methods – frequency set by the Ecosystem Based Land Management process and method (Shepherd 2004) Lease risk (and need for compliance inspection) informed by regular monitoring, new lease management information, regional thresholds and limits No further action if lease condition does not deteriorate and management remains at a high standard
Resourcing requirements	
Minimal monitoring – on-ground WARMS survey every 3 years and limited remote monitoring at 300 m resolution	Regular monitoring via WARMS survey and on-ground spatial monitoring integrated with remote sensing to provide spatial information at various temporal scales
Effectiveness of management	
No current measure of lease condition for reporting purposes – this is acceptable because general management is good	Report on lease condition Identify changes in condition should management change for the worse Provide the lessee or lease manager with more current and useful information about land condition and effectiveness of management actions

Fictitious scenario 2: Suboptimal condition and voluntary management plan

Example name: Middle Downs Lease

Location	Pastoral lease area	Potential carrying capacity
Mid-West (Murchison–Gascoyne)	170,000 ha	1,910 AE

AE = animal equivalent

Background

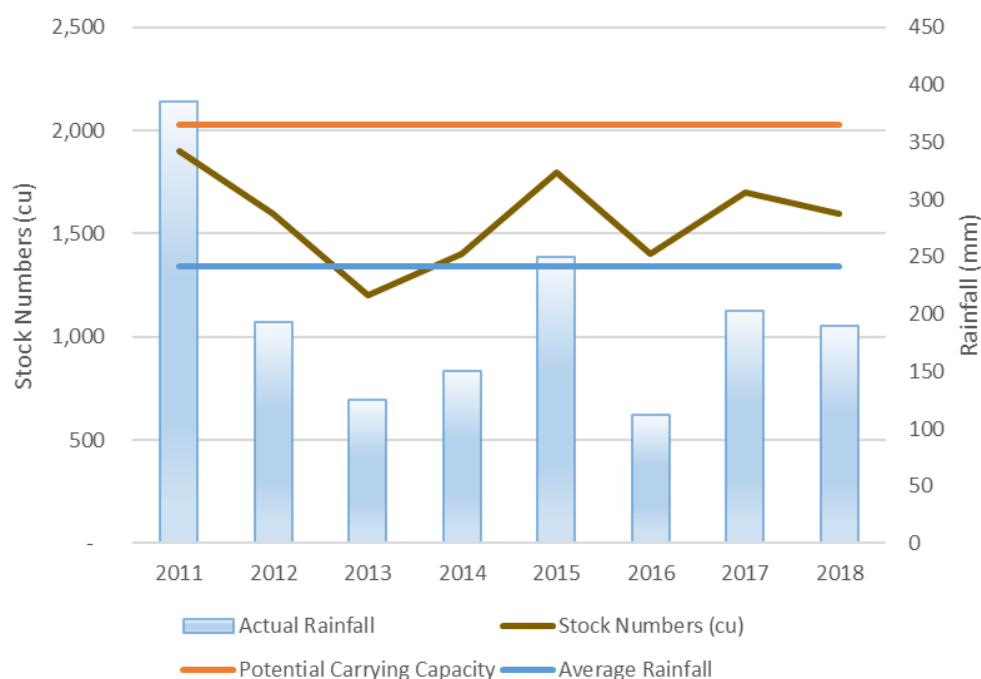
The lessee, Mr Max Middleton, acquired the lease in 2011 and still has a large mortgage to Rural Bank.

The last RCA of the lease was conducted in 2008, with 30% of the lease found to be in good condition, 30% in fair condition and 40% in poor condition. This represented a decline on the previous assessment from 2002 when 32% was in good condition, 40% in fair condition and 28% in poor condition.

Status

Condition

There has been long-term decline in rangeland condition on the lease, largely due to historical overstocking and, in more recent years, below-average seasonal conditions (Figure E2). There has been a decline in the condition of more productive pastures. The less productive spinifex-based pastures have generally remained in good to fair condition.



cu = cattle unit

Figure E2: Stocking rates and rainfall trends on Middle Downs Lease, 2011–18

Comparison to standards

The condition of land is now below the thresholds, with the percentage of key pastures in good condition dropping below 40% and the percentage of land in poor condition rising above 10%.

Management

Mr Middleton's approach to pastoral management is sound. He has reinstated previously disused water points to spread grazing pressures but is restricted in what he can achieve in the short term because of financial pressures. Although he initially reduced stock numbers run by the previous lessee, he continues to maintain relatively high numbers (although below the PCC), even in poor seasons.

He is responsive to suggestions from DPIRD's rangeland inspectors and has joined the local biosecurity group but sees on-ground rangeland monitoring as an imposition with little benefit to him personally and thinks it would be better if DPIRD inspectors did the monitoring.

Infrastructure

Infrastructure on the lease is in fair to poor condition, with no recent maintenance evident when Mr Middleton acquired it. There is a lack of fencing and water – only about 60% of the lease can be effectively grazed, and there is little capacity to control grazing pressure on more productive pastures. As finances allow, he has installed new fencing, trap yards and water infrastructure, with a particular focus on fencing some of the heavily grazed river country. However, to date he has only installed 5 trap yards and constructed 85 km of fence lines along the river frontage, which is about 20% of the paddocks fronting the river.

Risk evaluation considerations

Stock and other grazing pressures

After acquiring the lease, Mr Middleton reduced stock numbers by about 500 head but has since maintained stock numbers between 1,200 and 1,800 animal equivalents (AE), with requirements to meet his mortgage repayments limiting his responsiveness to seasonal conditions.

However, Mr Middleton musters regularly, and transports cattle off lease to sale and finishing depots in the south-west agricultural region as early in the season as he can. He uses low-stress stock handling techniques. All stock passing through the yards receive animal health treatments and vaccinations and are dehorned. He carefully selects stock to keep on the lease to improve overall herd quality, while introducing better herd bulls, as finance allows.

Mr Middleton is aware of grazing pressure from other grazers (particularly horses, donkeys, and kangaroos) and has been reducing their numbers on the lease.

Finances

Mr Middleton has a large mortgage acquired when he purchased the lease, and this limits his ability to improve the lease or reduce stock numbers sufficiently to allow the land to recover. However, he has recently picked up a water-carting contract with the local shire to supplement his income and would like to investigate options for carbon farming on parts of the lease.

Compliance history

Following the 2008 RCA, the PLB directed the previous lessee to reduce stock numbers to the current carrying capacity of 1,500 CU by 31 December 2008. The lessee was then asked to keep stock numbers at or below 1,500 CU until they could demonstrate to the satisfaction of the PLB that rangeland condition on the lease had improved.

When the compliance situation was evaluated before the lease was renewed, it was noted that the new lessee had complied with the reduction in stock numbers in 2013 and 2014 and was deemed to be eligible for renewal.

Risk evaluation outcome

Based on the risk evaluation, although the land condition is currently suboptimal (i.e. below the regional threshold and above the regional limit), the lessee is making sufficient voluntary management adjustments to improve this status (Figure E3). It is

recommended that a review is undertaken in 2 years to assess the degree to which these adjustments have been implemented and evidence of their effectiveness. The monitoring and compliance approach for Middle Downs Lease is in Table E2.

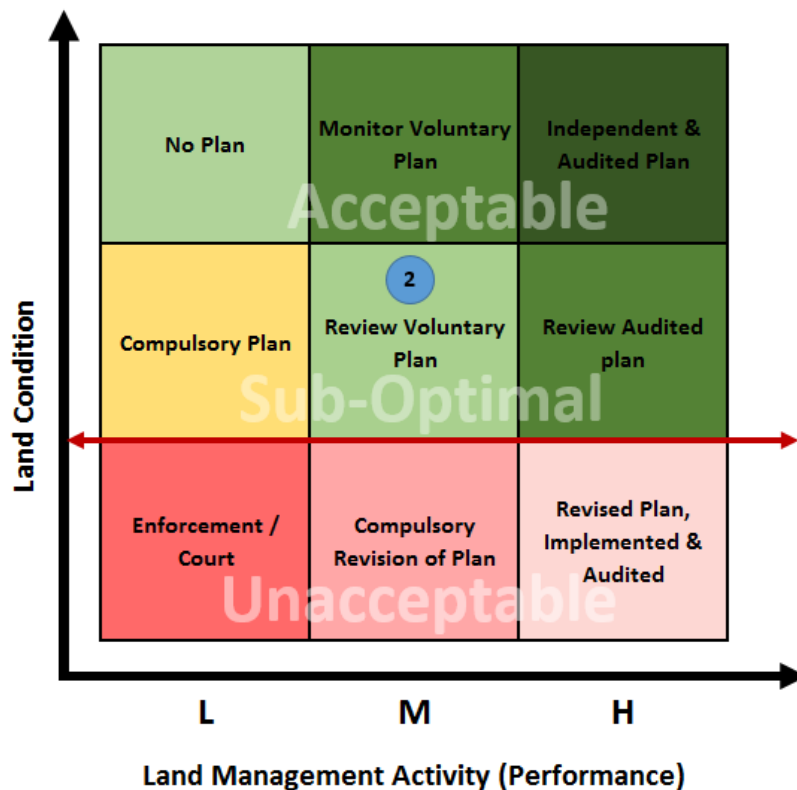


Figure E3: Placement of Middle Downs Lease (blue dot) in the risk evaluation matrix

Table E2: Monitoring and compliance program

Current approach	Proposed approach (lessee determined)
Monitoring	
Regular monitoring RCAs finished in 2009. The 2019 RCA was done in response to the lease being identified as being at risk of degradation, resulting in a compliance inspection Before 2018, DPIRD sent reports to the PLB highlighting leases or areas in poor condition. Experience suggests these reports have not had any positive effect on improving rangeland condition	Two-tiered monitoring with data and photographs collected at assessment sites, and remote sensing to analyse vegetation cover of preferentially grazed land systems to determine seasonal causality of trend in vegetation cover

(continued)

Table E2 (continued): Monitoring and compliance program

Current approach	Proposed approach (lessee determined)
Resourcing requirements	
Minimal monitoring with on-ground WARMS surveys every 3 years and limited remote monitoring at 300 m resolution	<p>Data recording sheet, boundary, paddock and land system polygons, and identification of the key pasture types.</p> <p>Each photo site to be incorporated into the PMS method to accurately record plant counts; site location recorded by GPS with latitude and longitude; high-resolution camera, greater than 5 MB</p> <p>Access to reliable internet to run satellite monitoring platforms, such as VegMachine (CSIRO) or other platform that needs to download large volumes of cached data to operate</p>
Management or compliance advice	
There is minimal direct assistance or encouragement to improve land management effectiveness	<p>Where the RCA and risk assessment of condition, management, and season suggests the lease is, or will be, below the threshold but above the limit for the coming year, DPIRD will pass on this information to the PLB for their consideration</p> <p>A compendium of best practice land management practices will be made available to the lessee. This will include options for relevant accreditation and third-party certification schemes designed to encourage improved performance</p>
Effectiveness of strategies	
There is unreliable subjective information that is not quantified	<p>A reliable method covering rangeland cause and effect due to seasonal issues (NDVI); precise vegetation cover measurements (FA); comprehensive detailed on-ground plant identification; inclusive of each RCA site; broader assessment of the immediate land system on which the RCA site is situated.</p> <p>Using DPIRD common terminology; evidence-based knowledge from DPIRD, other government agencies and other land managers working to the same method.</p>

Fictitious scenario 3: Unacceptable condition and no plan

Example name: Hummock Downs Lease

Location	Pastoral lease area	Potential carrying capacity
Kimberley	250,000 ha	4,000 AE

AE = animal equivalent

Background

Hummock Downs does not appear to have a long-term perspective as evidenced by its continued and consistent overstocking. This implies that the target rate of return on investment is too high for the sustainable stocking rate to bear. Annual stock returns indicate the lessee has been running 3 times the sustainable pasture stocking level, on average, for the past 10 years. The lease is dominated by soft and hard spinifex pastures. There are some productive areas of palatable native grasses and buffel grass along the creeklines.

Summer rainfall has increased across the lease, although the 2017–18 wet season was very much below average.

Status

Condition

The RCA in 2019 found 40% of the lease was in good condition, 40% in fair condition and 20% in poor condition. The RCA in 2009 indicated 60% of the lease was in good condition, 30% in fair condition and 10% in poor condition. These proportions were worse for the more productive pastures and landscapes. This degradation of the lease is typical of overgrazing. Land in poor condition country is largely the productive native grass pastures.

Comparison to standards

The area of bare ground in some landscapes is more than the limit of 15%. The area of land in poor condition in 2 of the 3 most productive landscapes is also more than the limit of 30%.

Management

The decline in condition across the lease can be attributed to:

- excessive grazing pressure, at more than 3 times the lease's estimated current carrying capacity
- lack of wet season spelling of more productive pastures. The WARMS data suggest palatable native grasses have been displaced by hard spinifex, which is undesirable in terms of productivity.
- lack of infrastructure to spread stock across the lease – currently one-third of the lease is not used, so stock are concentrated on the remaining two-thirds
- lack of a documented plan to deal with long-term total grazing pressure (stock numbers, feral and native animals) and in the short term to destock in response to the present lack of pasture.

Risk evaluation considerations

There has been a good run of wet seasons since the 2009 inspection. However, the 2017–18 wet season was below average and coupled with inadequate planning by the lessee to act quickly and reduce stock numbers to match the lease's carrying capacity, large areas are now devoid of groundcover and are susceptible to erosion. These factors also negatively affect breeder body condition and herd re-conception rates.

Considering the generally good run of seasons since the 2009 inspection, there is evidence of a decline in rangeland condition. With careful management – particularly in matching pasture supply to stock numbers and wet season spelling – land condition across this lease could improve.

Compliance history

Following the 2009 RCA, the lessee submitted a management plan to the PLB. This plan was provided to DPIRD for comment and DPIRD rejected it because it did not address how the lessee would address high stock numbers across the lease. The PLB subsequently requested a development plan, but the lessee avoided communication with the PLB, despite repeated attempts at communication.

Risk evaluation outcome

Based on the risk evaluation (Figure E4), it is recommended that formal enforcement actions are initiated to generate improvements in managing and operating the lease. These actions would involve direct annual monitoring until sufficient progress has been made (Table E3).

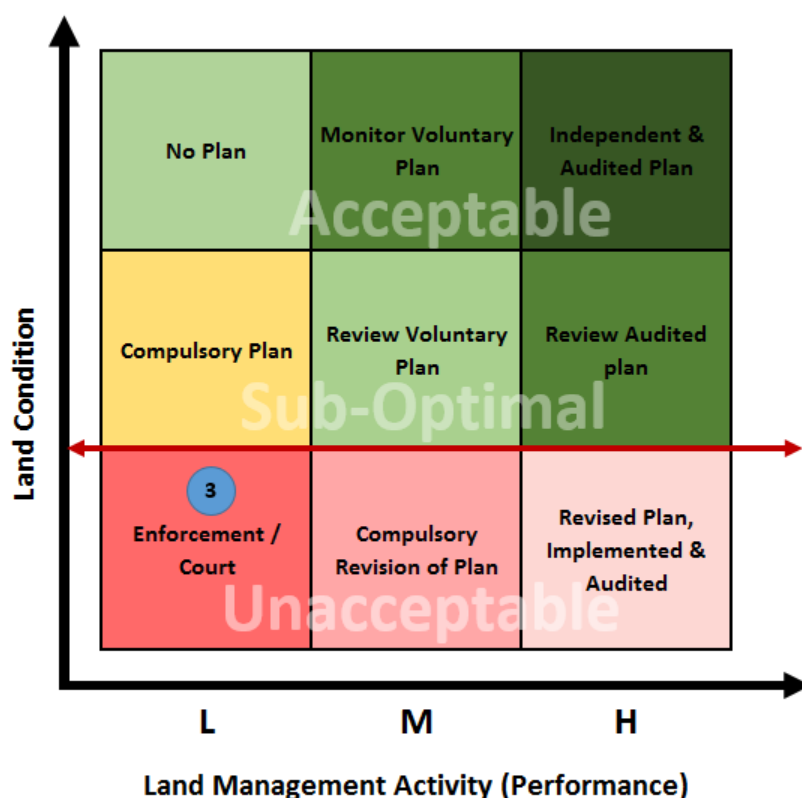


Figure E4: Placement of Hummock Downs Lease (blue dot) in the risk evaluation matrix

Table E3: Monitoring and compliance program

Current approach	Proposed approach (Commissioner determined)
Monitoring	
<p>Regular monitoring RCAs finished in 2009. The 2019 RCA was done in response to the lease being identified as being at risk of degradation, resulting in a compliance inspection</p> <p>Before 2018, DPIRD sent reports to the PLB highlighting leases or areas in poor condition. Experience suggests these reports have not had any positive effect on improving rangeland condition</p>	<p>Mix of annual monitoring and compliance inspections until sufficient progress has been made</p> <p>Lessee directed to develop a management plan to address issues and to reduce stock number to the lease's current carrying capacity, with the number to remain at this level until rangeland condition is improved</p>
Resourcing requirements	
<p>Minimal monitoring with on-ground WARMS surveys every 3 years and limited remote monitoring at 300 m resolution</p>	<p>For a lease in poor condition, it is desirable for DPIRD staff to visit at least every 2 years and advise about wet season spelling, maintaining groundcover and stock numbers</p> <p>Continued WARMS and on-ground spatial monitoring integrated with remote sensing to provide spatial information at various temporal scales</p>
Effectiveness of management	
<p>Minimal or no use of recommended best practice. No obvious planning for sustainability.</p>	<p>Regulatory body enforces reduction in stock number to the lease's CCC and numbers remain at this level until rangeland condition is improved.</p> <p>Regular monitoring and reporting of land condition to demonstrate improvements in land condition.</p> <p>Lessee provided with current best practice information, and information about land condition and effectiveness of management actions.</p>

Shortened forms

Definition of rangelands terms used in this document are listed in the glossary on the DPIRD website, agric.wa.gov.au/rangelands/rangelands-glossary.

Short form	Long form
AE	animal equivalent
BAM Act	<i>Biosecurity and Agriculture Management Act 2007 (WA)</i>
CCC	current carrying capacity
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DPIRD	Department of Primary Industries and Regional Development
EP Act	<i>Environmental Protection Act 1986 (WA)</i>
ESD	ecologically sustainable development
ESG	environmental, social and governance
GPS	global positioning system
ha	hectare
IRG	Industry Reference Group
ISC	Interagency Steering Committee
ISO	International Organization for Standardization
km	kilometre
LA Act	<i>Land Administration Act 1997 (WA)</i>
LCD	land conservation district
MB	megabyte
mm	millimetre
NRM	natural resource management
OAG	Office of the Auditor General
PCC	potential carrying capacity
PLB	Pastoral Lands Board
RBM	risk-based management
RCA	rangeland condition assessment
SCN	Soil Conservation Notice
SLC Act	<i>Soil and Land Conservation Act 1945 (WA)</i>
WA	Western Australia
WARMS	Western Australian Rangeland Monitoring System

References

Al-bukhari A, Hallett S and Brewer T (2018) A review of potential methods for monitoring rangeland degradation in Libya, *Pastoralism: Research, Policy and Practice*, 8:13, doi.org/10.1186/s13570-018-0118-4.

CoAG (Council of Australian Governments – Ecologically Sustainable Development Steering Committee) (1992) [*National strategy for ecologically sustainable development*](#), Department of Sustainability, Environment, Water, Population and Communities website, accessed 14 January 2022.

DPIRD (Department of Primary Industries and Regional Development) (2018) [*Western Australian natural resource management framework 2018 \[PDF 890 KB\]*](#), accessed 14 January 2022.

DPIRD (Department of Primary Industries and Regional Development) (2021) [*Monitoring rangeland condition*](#), DPIRD website, accessed 30 May 2022.

DPLH (Department of Planning, Lands and Heritage) (2020) [*Good pastoral land management guidelines \[PDF 9.2 MB\]*](#), DPLH, Perth.

FAO (Food and Agriculture Organization) (2002) [*What are the main EAF management planning steps*](#), FAO website, accessed 14 January 2022.

FAO (Food and Agriculture Organization of the United Nations) (2014) [*Sustainable food and agriculture – Frameworks and approaches*](#), FAO website, accessed 29 July 2021.

Fletcher R (2020) *Framework for sustainable pastoral management*, Department of Primary Industries and Regional Development, Western Australian Government.

Fletcher R, Sudmeyer R, Ryan K, Fletcher M, Holmes K, Thomas P, Barker D, Fletcher W, Ramzi P and Penny N (2022) *Pastoral land condition standards: Conceptual basis and West Kimberley region case study. Consultation paper*, Department of Primary Industries and Regional Development, Western Australian Government.

Fletcher W and Bianchi G (2014) 'The FAO – EAF toolbox: Making the ecosystem approach accessible to all fisheries', *Ocean & Coastal Science*, 90:20–26, doi.org/10.1016/j.ocecoaman.2013.12.014.

Fletcher WJ (2002) 'Policy for the implementation of ecologically sustainable development for fisheries and aquaculture within Western Australia', *Fisheries Management Paper 157*, Department of Fisheries, Western Australia.

Fletcher, WJ (2008) *Implementing an ecosystem approach to fisheries management: Lessons learned from applying a practical EAFM framework in Australia and the Pacific*, The Ecosystem Approach to Fisheries: Chapter 8 pp 112–124, FAO Conference Report, doi.org/10.1079/9781845934149.0112.

Fletcher WJ (2015) 'Review and refinement of an existing qualitative risk assessment method for application within an ecosystem-based management framework', *ICES Journal of Marine Science*, 72:1,043–1,056, doi.org/10.1093/icesjms/fsu142.

FutureBeef (n.d.) [Best practice](#), FutureBeef website, accessed 14 January 2022.

FutureBeef (2022) [Rolling ball model – a slippery slope to poor productivity](#), FutureBeef website, accessed 14 January 2022.

Herrick JE, Van Zee JW, McCord SE, Courtright EM, Karl JW and Burkett LM (2017) [Monitoring manual for grassland, shrubland, and savanna ecosystems, Volume I: Core methods](#), 2nd edn, USDA ARS Jornada Experimental Range, Las Cruces, New Mexico, accessed 29 July 2021.

Holmes K and Ramzi P (2022) *Mapping pasture types for the Kimberley region*, Department of Primary Industries and Regional Development, Western Australian Government.

ISO (International Organization for Standardization) (2018) [AS/NZS ISO 31000 2018 Risk management – Guidelines](#), ISO website, accessed 14 January 2022.

ISO (International Organization for Standardization) (2019) [IEC 31010:2019 Risk management – Risk assessment techniques](#), ISO website, accessed 30 July 2021.

Liniger HP, Mekdaschi Studer R, Hauert C and Gurtner M (2011) [Sustainable land management in practice – guidelines and best practices for sub-Saharan Africa](#), TerrAfrica, World Overview of Conservation Approaches and Technologies (WOCAT) and Food and Agriculture Organization of the United Nations (FAO), accessed 30 July 2021.

National Research Council (1994) *Rangeland health: new methods to classify, inventory, and monitor rangelands*, National Academies Press website, Washington, DC, <https://doi.org/10.17226/2212>.

OAG (Office of the Auditor General) (2017) [Management of pastoral lands in Western Australia](#), Report 17, OAG website, accessed 30 July 2021.

Pellant M, Shaver PL, Pyke DA, Herrick JE, Lepak N, Riegel G, Kachergis E, Newingham BA, Toledo D and Busby FE (2020) [Interpreting indicators of rangeland health](#), version 5, Tech Ref 1734-6, US Department of the Interior, Bureau of Land Management, National Operations Center, Denver, CO, accessed 5 April 2022.

Phelps D (2012) [Best-bet practices for managing the Mitchell grasslands of Queensland: a technical guide of options for optimising animal production, profitability and land condition](#), Meat and Livestock Australia and Department of Employment, Economic Development and Innovation, Queensland, accessed 3 October 2022.

PLB (Pastoral Lands Board) (2018) *Priorities for strengthening the economic viability and ecological management of the pastoral estate*, Advice to Government, PLB, Western Australian Government.

PLB (Pastoral Lands Board) (2021) [Statement of strategic intent 2021–2023 \[PDF 1.7 MB\]](#), accessed 24 March 2022.

PSC (Public Sector Commission) (n.d.) [Good governance guide for public sector agencies checklist](#), WA.gov.au, accessed 9 November 2021.

Riginos C and Herrick JH (2010) [Monitoring rangeland health: a guide for pastoralist communities and other land managers in Eastern Africa \[PDF 3.2 MB\]](#), version II, ELMT-USAID, Nairobi, Kenya, accessed 14 January 2022.

Ryan KG, Tierney EH, Novelty PE and McCartney R (2013) *Pasture condition guide for the Kimberley*, Department of Agriculture and Food, Western Australia.

SA (Standards Australia) (2013) [Risk management - Guidelines on risk assessment techniques](#), SA SNZ HB 89-2013, SA website, accessed 30 July 2021.

SELN (State Extension Leaders Network) (2006) *Enabling change in rural and regional Australia: the role of extension in achieving sustainable and productive futures – a discussion document*, doi.org/10.13140/2.1.1994.9447.

Shepherd G (2004) [The ecosystem approach: Five steps to implementation \[PDF 609 KB\]](#), IUCN, Gland, Switzerland and Cambridge, UK.

Westoby M, Walker B and Noy-Meir I (1989) 'Opportunistic management for rangelands not at equilibrium', *Journal of Range Management*, 42(4):266–274, doi.org/10.2307/3899492.