Pilbara Mesquite Management Strategy 2014 to 2017

Jan 2014

Prepared for
Pilbara Mesquite Management Committee

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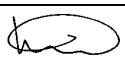
0	22/07/2015	L. Anderson	W. Wishart	

Chairman's Forward

The Pilbara Mesquite Management Committee (PMMC) is a dynamic community group coordinating and implementing best-practice mesquite management programs throughout the Pilbara pastoral region. Operating since 2002, the PMMC has become one of the most ambitious and successful groups of its kind, working directly with land managers in securing the future of weed-free landscapes.

Mesquite is a particularly threatening weed to rangeland ecosystems, with detrimental impacts in the conservation, tourism, agriculture and mining sectors. Its highly invasive and dominating nature has resulted in mesquite being declared on the inaugural list of Australia's 20 worst weeds (Weed of National Significance). On a state basis, the Pilbara is home to the largest populations of mesquite, with some 300,000 hectares of land known to be infested with the thorny menace.

This is the second strategy for managing mesquite in the Pilbara, and builds on the actions and lessons learned under the Pilbara Mesquite Strategy 2007-2013. We have grown in many ways since our first strategy was developed, with increasing membership, more infestations under active management and a diversification in the base financial support for our group and its activities.

The economic and physical landscape in which we operate has also presented many challenges over the past five years, with greater competition for diminishing external funds and an increase in the diversity of land uses in the region, particularly the expansion of the mining and gas industries.

This strategy was put together by members of the PMMC, and will guide our group to ensure we remain dynamic, relevant and focused on active management and localised eradication of mesquite in the Pilbara. The strategy prioritises activities which will assist in the protection of environmental, social and economic assets in the region from the thorny invasion of mesquite.

The PMMC is actively battling mesquite across the region, locally coordinating landholder resources with external funding and support to contain and control the weed. Our successes result from the local support offered by our project staff, the enthusiasm and dedication of landholders and the community and the commitment of our major sponsors investing in weed management. It is vitally important that these three key factors continue to drive the PMMC and its projects, helping to achieve the key objectives and actions contained within this Strategy.

The PMMC has undergone a tremendous transformation in the past five years, and we hope with the continued participation of land managers and the broader community we can actively support mesquite management in the Pilbara for another ten. Collaboration and coordination are the keys to our success; so too is the commitment of our members.

Joe Armstrong
Chairperson
Pilbara Mesquite Management Committee Inc.

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1 Introduction

1.1 Background

The Pilbara Mesquite Management Strategy (PMMS) (2014-2017) sets the direction for the management of mesquite (*Prosopis* spp.) within the Pilbara bioregion under the guidance of the Pilbara Mesquite Management Committee (PMMC).

Weed management in Western Australia (WA) is guided by both State and Federal legislation and policy arrangements. The primary legislative requirements to manage weeds are contained within the *Biosecurity and Agriculture Management Act 2007* (BAM Act). The coordination of weed legislation, regulation and policy in WA is undertaken by the Department of Agriculture and Food Western Australia (DAFWA), the Department of Parks and Wildlife (DPaW) and the Department of Regional Development and Lands (DRDL). The *Land Administration Act 1997* governs the operation of pastoral leases in WA. Most Crown land in the State is held under this Act, including pastoral leases and areas set aside as 'Unallocated Crown Land'. Under this Act there are conditions on pastoral leases to control weeds and pests and protect indigenous pasture and native vegetation. Virtually the entire area of rangelands in WA is administered under the *Land Administration Act 1997* by the DRDL.

Development of the PMMS was undertaken by Astron Environmental Services Pty Ltd and overseen by a working group of members of the PMMC throughout 2013.

1.2 Pilbara Mesquite Management Committee (PMMC)

The PMMC is a not-for-profit group formed in 2002 which combines the knowledge and skills of the Government, industry, research, pastoral and community sectors to tackle one of the greatest threats to natural resources in the Pilbara – mesquite, a Weed of National Significance (WoNS).

Based locally in Karratha, the PMMC is primarily concerned with the regional coordination and active management of mesquite. The PMMC has traditionally worked with State and Federal natural resource management programs to deliver research, on-ground and management outcomes for the Pilbara environment. Additionally, broad partnerships with the pastoral community, local resource projects and other Government and non-Government organisations ensures that the committee works collaboratively with land managers to achieve regional objectives.

The overarching objectives of the PMMC are to ensure that; mesquite and parkinsonia[1] management across the Pilbara region is coordinated, that strategic weed control programs and partnerships are developed across land tenures and that investment is focused on the most at-risk assets and high priority infestations.

The PMMC directly employs one full time, Karratha based Project Manager. Responsible for the overall management of projects which the PMMC undertakes, this position is supported generously by Rangelands Natural Resource Management (NRM), with logistical support provided by the City of

[1] The PMMC also oversees the control of other Declared Pests in the Pilbara region including *Parkinsonia aculeata*. Only mesquite (*Prosopis* spp.) are considered in the scope of this Plan.

Karratha and the DAFWA. Volunteer members from partner organisations make up the rest of the committee.

To ensure the most productive and efficient use of funds and resources, it is of increasing importance to the PMMC to ensure that a strategic approach to mesquite management is adopted together with ongoing monitoring and evaluation and adaptive management.

1.3 Scope

The scope of the PMMS includes all species of mesquite that occur within the Pilbara region of WA.

The Pilbara region is defined by the Interim Biogeographic Regionalisation for Australia (IBRA). The Pilbara region covers a land area of 17,823,126 hectares (ha) and is divided into four subregions: Chichester, Fortescue, Hamersley and Roebourne. The scope includes all occurrence of mesquite within the Pilbara region regardless of land tenure and includes both public lands and private lands.

The PMMS is a high level document, guiding general direction for both public and private investment and effort. It is not an operational plan intended to guide the treatment of mesquite on a year to year basis. It provides strategic objectives and describes actions required to move towards the achievement of the objectives over the course of a four year period (the term of the document).

2 Current Status

2.1 Mesquite

Originating in America, mesquite (*Prosopis* spp.) was first recorded in Australia in the early 1900s. Original plants were spineless and widely planted as a shade tree throughout towns and on station homesteads across western Queensland and north-western WA. Trees rapidly became weedy and spinescent and by the 1950s mesquite was recognised as a potentially serious weed. It has now evolved as one of Australia's most destructive weeds due to its invasiveness, potential for establishment and spread in many soil types, and the social, economic and environmental impacts it causes.

Pastoralism primarily, and more recently mining are the main land uses in areas most susceptible to mesquite invasion. Severe mesquite infestations can significantly reduce the production of native and introduced pasture species, resulting in a reduction in land carrying capacity. The loss of productive land together with the high costs of control can have a severe economic effect on landholders.

Dense mesquite infestations pose a serious environmental threat to ecological function by displacing native species and lowering of the water table and soil moisture. This results in land and soil degradation and loss of habitat. Grasslands and water courses are particularly sensitive to mesquite invasion.

There are three species and probably several hybrids of mesquite that occur in the Pilbara, including *Prosopis pallida*, *P. glandulosa* and *P. velutina*. Whilst all problematic, the most widespread species of mesquite in the Pilbara is a hybrid pallida-glandulosa mix. All species of mesquite are prohibited under Section 12 of the BAM Act, with all species present in the state declared as C2 plants (eradication).

Since 2007 through the concerted efforts of the PMMC together with the pastoral community, local resource projects and other Government and non-Government organisations the severity of some infestations in the Pilbara has been reduced and contained. Other stations continue to struggle to contain infestations that have significantly increased since the 1980's. The scale of the infestation on the Mardie pastoral lease remains the largest in Australia.

2.2 Declaration Status

The principle legislation guiding weed management within WA is the BAM Act. The objective of the BAM Act is to prevent the introduction, manage the impacts and limit the spread of animal and plant pests within the state. Under the BAM Act the Minister for Agriculture may 'declare' classes of plants (and animals) as species that need to be controlled in WA. These species may also be assigned to categories depending on the level of control they require.

The key points of the BAM Act, with relevance to this strategy are that it:

- regulates entry and movement of declared plants
- prescribes the requisite control or eradication efforts
- includes weed seeds as a contaminant in produce.

Declared Plants are listed pursuant to Section 35 of the BAM Act, and land managers are obliged to control these plants in accordance to the class under which they are declared. The BAM Act makes provision for three categories of Declared Pests (Table 1).

Table 1: Categories of Declared Pests (BAM Act).

Category	Requirement	Description
C1	Exclusion	Pests are assigned to this category if they are not established in Western Australia and control measures are to be taken, including border checks, in order to prevent them entering and establishing in the State.
C2	Eradication	Pests are assigned to this category if they are present in Western Australia in low enough numbers or in sufficiently limited areas that their eradication is still feasible.
C3	Management	Pests are assigned to this category if they are established in Western Australia but it is feasible, or desirable, to manage them in order to limit their damage. Control measures can prevent a C3 pest from increasing in population size or density or moving from an area in which it is established into an area which currently is free of that pest.

The Western Australian Organism List (WAOL) is a register of organisms that are described in a declaration category under the BAM Act. Most species of mesquite are categorised as C1 (are not known to be present in the state) with the exception of *Prosopis pallida* (C2) and P. glandulosa Torr. x P. velutina (C2 for whole of state, except Mardie Station where it is listed as a C3).

2.3 Known Distribution

The current known distribution of mesquite in the Pilbara region is depicted in Figure 1. The Mardie pastoral lease has the single largest infestation of mesquite in Australia which covers two thirds of the 225,000 ha pastoral grazing lease. This includes an extremely dense infestation on the mouth of the Fortescue River (45,000 ha) and a threatening population at the mouth of the Robe River (21,000 ha). The population is comprised of a hybrid mix of species, which has given it extra robustness in surviving in the semi-arid conditions of the Pilbara.

Discrete populations of mesquite also exist on coastal river systems in the Pilbara, including the DeGrey River (1,000 ha), Maitland and Yanyare Rivers (15,000 ha), Cane River (10,000 ha) and Ashburton River (75,000 ha). These infestations are dominated by the *P. pallida* species of mesquite, commonly tall single stemmed trees.

The infestation of mesquite on the DeGrey River only contains a few plants, however trees controlled in the past were extremely large and old. The small population does not appear to be reproducing as regularly or in the same quantities as other Pilbara infestations, with few new plants appearing annually.

The Maitland and Yanyare infestation was only discovered in 2012, after station workers reported several mature plants visible from station tracks. The infestation currently covers approximately 1,600 ha of dense mesquite on the Yanyare River, with scattered plants populating a further area of approximately 14,400 ha.

The infestation of mesquite on the Cane River is unique for the Pilbara in that it is contained within a swampy area, which can become waterlogged for months following decent rainfall. This makes the infestation inherently difficult to manage, as access is impossible to predict and terrain is very rough.

A rapid transformation in the density and distribution of mesquite on the Ashburton River has been occurring since the mid-1990s. This is thought to be a result of the shift from long-established sheep grazing to cattle production, coupled with a severe reduction in intensive control programs traditionally undertaken.

The infestation is continuing to explode across two pastoral stations and a number of industry resource tenements, despite efforts to bring the population under control. Dominated by the tree-form mesquite *P. pallida*, mesquite on the Ashburton is threatening to become an infestation similar in structure and size to the core infestation of mesquite on Mardie Station.

2.4 Potential Distribution

The potential distribution of mesquite species was predicted using CLIMEX, a simulation modelling system developed by CSIRO (Figure 2). The model predicts that the majority of the northern half of Western Australia has favourable climatic conditions for the establishment of *P. pallida*, including the entire Pilbara region. The climate suitability for *P. glandulosa* and *P. velutina* was considered to be low, such that permanent populations were largely improbable in the Pilbara.

To date, most mapping of mesquite has been undertaken by aerial survey using trained spotters and by the collection of point based data collected during control programs. In recent times, remote sensing techniques using 3-band aerial imagery at 2m spatial resolution have been used to successfully map mesquite species to an accuracy of 90% (Mirik M, and Ansley R.J. 2012). With available satellite imagery at similar pixel sizes, and having a much higher spectral resolution, the opportunity to map such species over a broad scale is now possible, and very high levels of accuracy may be achieved, particular with imagery taken at times of highest photosynthetic activity.

2.5 Management Options

Successful mesquite management will require a significant investment of time and resources over an extended period. In particular, the control of infestations that cover large spatial extents and cross multiple land tenures requires careful planning, coordination, prioritisation and long term funding. Results may not be immediately apparent, as repeated effort may be required to produce obvious reductions in distribution and density. Regular standardised monitoring is necessary to prove effectiveness of any control method utilised and to guide further effective management.

There are a number of control options most of which need to be used collaboratively in order to be successful in the eradication of plants and propagules from an area over time. These include chemical treatment such as basal bark treatment (most common), cut stump treatment, foliar spraying and the application of granular herbicides. Mechanical treatments include blade ploughing (most common), dozing and chaining. In the Pilbara only dozing with attached cutter blades has been effective for removal of mesquite. Straight dozing and chaining are not effective or recommended for management of Pilbara mesquite.

Fire is not commonly used as a tool for controlling mesquite due to its limited effectiveness. However, it is sometimes used as a complimentary measure as part of an integrated program such as to reduce understory or to clean up areas after mechanical treatment.

Biological control agents for mesquite management have been used since the late 1990's with varying levels of success. Introduced agents have included a leaf-tying moth (*Evippe* spp.), seed feeding beetles (*Algarobius prosopis and A. Bottimeri*) and sap-sucking psyllid (*Prosopidosylla flava*). Whilst it is difficult to find quantitative information relating to the success of these controls, anecdotal evidence suggests that the leaf-tying moth has been the most successful agent in terms of

survivability of the Pilbara climate, and visible impacts on especially hybrid mesquite. The stress caused to mesquite plants consistently attacked by *Evippe* spp. has reduced the growth rate of plants to 17% of annual capacity, and halted the majority of the reproduction of adult plants (L Anderson, pers comm, 2013).

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Figure 1: Distribution of mesquite in the Pilbara region of Western Australia, 2013. Source: PMMC 2013.
Author: W. Wishart
Drawn: H. Thornton
Date: 24-03-2014
Figure Ref. 90112-GDR-1RevA-140324_Fig01

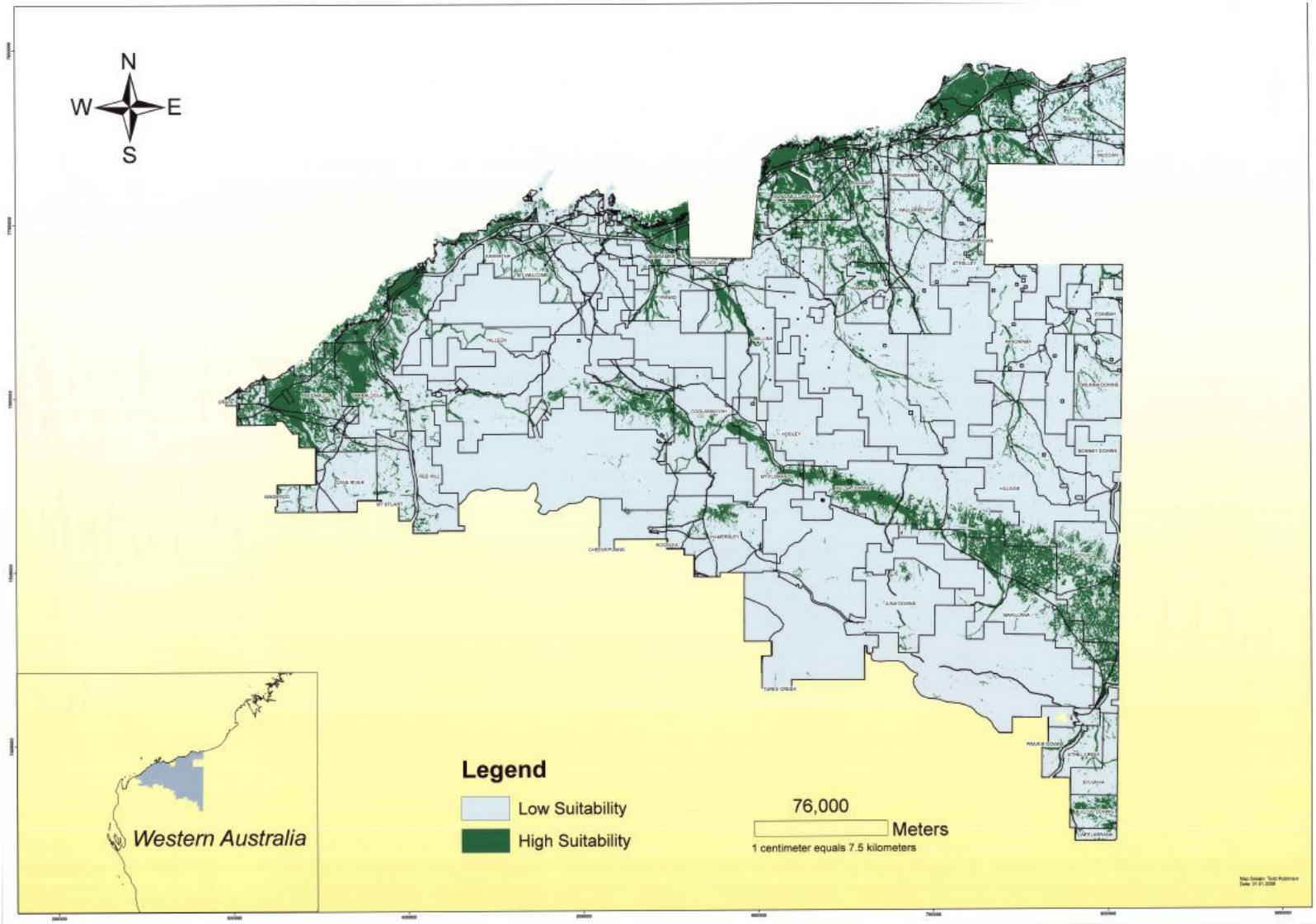

Figure 2: Potential distribution of mesquite in the Pilbara region of Western Australia. Source: CSIRO 2008.

3 Management Approach

3.1 National Strategy

WoNS are high impact, established weeds for which targeted, strategic and nationally-coordinated co-investment will deliver long-term benefits across Australia. WoNS cause major economic, environmental and/or social and cultural impacts in a number of states/territories, and have a significant potential for further spread.

In 1999 all States and Territories agreed to the initial WoNS list. The assessment process prioritised these weeds against their invasive characteristics and potential impacts. The assessment process and inaugural WoNS were fully endorsed by relevant Ministers for the environment, primary industries and forestry across Australia.

A national strategic plan for each WoNS was developed and prioritised actions to better manage the weed. Each plan is endorsed by the relevant ministerial council or standing committee and the Australian Weeds Committee (AWC) oversees implementation.

Coordination of these plans at a national level promotes consistent and efficient management across States and Territories, improves linkages between research and on-ground control, and encourages commitment from a wide range of stakeholders.

The PMMS has been developed in appreciation of the national Mesquite Strategic Plan (AWC 2012). It also seeks to align closely and be complementary to the National Priority Action Framework for Mesquite (AWC 2008) which seeks to:

1. Coordinate management
2. Reduce impact
3. Eradicate
4. Prevent spread.

The National Mesquite Strategic Plan can be assessed online at www.weeds.org.au.

3.2 Community Led

The strategy has been formed on the basis of a 'community led approach' similar to that adopted by the Victorian Gorse Taskforce (VGT 2013). This is a deviation from how governance of weeds, and particularly declared pests have been managed in the past, where there has been a reliance on regulators such as DAFWA to enforce legislation and ensure land managers take responsibility for declared plants and other invasive species on their land. A sole reliance on regulatory enforcement as a way of managing widespread invasive species in the Pilbara and elsewhere, has to date proved largely ineffective due to cost, resourcing requirements and competing priorities.

The PMMC was formed to create a cooperative model of governance between government, community, mining proponents, pastoralists and other concerned individuals or groups to deal with the threat of mesquite in the Pilbara. As such the committee is designed to be community-driven and focused on providing strategic direction, technical direction and in some cases financial support for mesquite management projects in its region.

It is believed that a cooperative approach leads to increased participation in decision making from a range of stakeholders who may have different expertise, experience, opinions and approaches.

Together, a diverse team leads to a greater understanding of the problems faced and therefore increases the potential for good decision making and improved management outcomes. Ownership of management decisions may also promote a more determined effort to make the plan work successfully.

3.3 Prioritisation

The prioritisation of mesquite management in the Pilbara region is underpinned by a 'biosecurity approach'. Informed by the invasive plants and animals invasion curve (Figure 3), a biosecurity approach adopts a risk-based strategy to intervention featuring four key management responses:

- prevention
- eradication
- containment
- asset protection.

Generally under this approach priority should be given to programs that prevent introduction or eradicate newly establishing outlying populations, over containment and programs to reduce the impact of established species on priority assets. This approach provides the greatest public benefit for government investment.

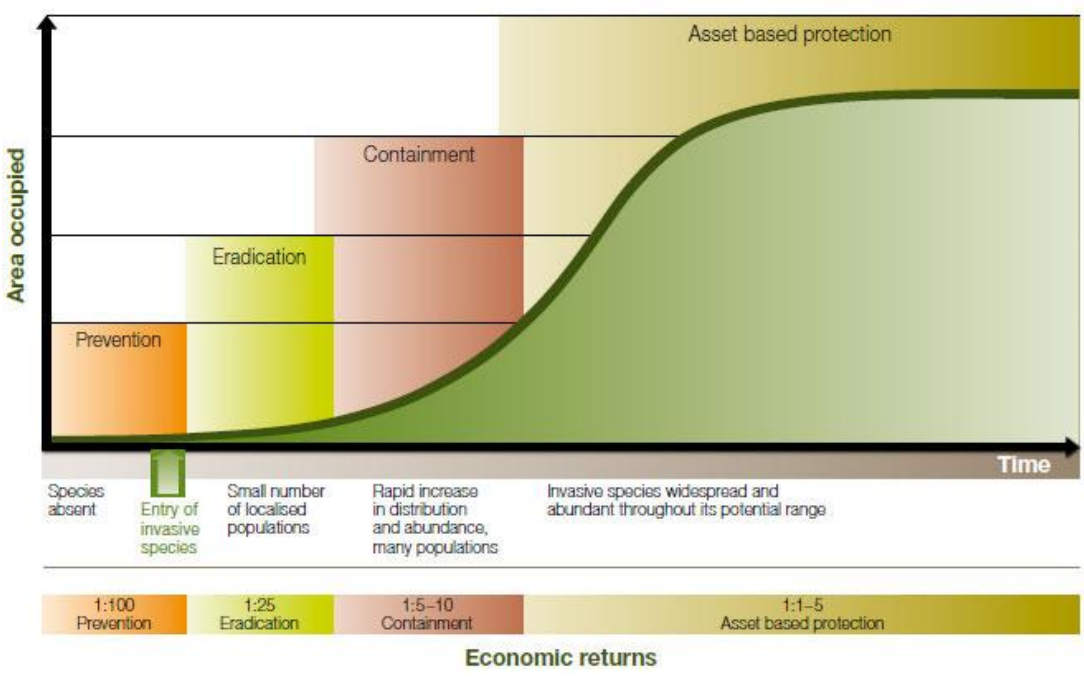

Figure 3: Generalised invasion curve showing actions appropriate to each stage. Source: DPI, Invasive Plants and Animals Policy Framework.

3.5 Key Principles

The management strategy is guided by the following key principles that were considered by the PMMC during strategy workshops held during 2013. These key principles should be the basis for future mesquite management and alignment with these principles when developing specific mesquite action plans should be ensured.

Coordination is critical

Mesquite management requires coordination amongst all stakeholders including Government, land managers, community groups and non-government organisations and individuals regardless of land tenure issues. Successful coordination requires a Project Manager, and an active and collaborative management committee.

Address cause not symptoms

To effectively manage mesquite for the long term it is critical that the causes of mesquite spread are identified and addressed rather than simply focusing on the continual treatment of the symptoms.

Prioritisation

Prioritisation of management areas should be underpinned by an evaluation of risk. Efforts should be towards preventing the spread of mesquite, eradicating outliers from main populations and containing and strategically treating larger populations to protect assets and reduce impact. Easy wins should be taken where ever possible.

Maintain gains

It is critical that the gains made through past management efforts are maintained as the cost of intervention increases exponentially as populations increase in density and size. Ongoing maintenance of previously treated areas must be scheduled into programs until such time as local eradication is certain.

Build capacity and knowledge

Mesquite in the Pilbara poses a significant environmental, agricultural and economic threat. This together with the expansive current distribution and vast potential distribution means that building the capacity to act and necessary knowledge make the right decisions are fundamental to effective management.

Demonstrate outcomes

An outcomes-based approach that monitors, evaluates and reports on the effectiveness of both strategy and actions is critical for the purposes of informing a process of continual improvement. It also serves to provide a 'return on investment' which is important for current and future funding.

4 Management Objectives

4.1 Vision

The vision for mesquite management in the Pilbara is that "Environmental, social and economic assets in the Pilbara are protected from the impact of mesquite invasion".

The vision will be achieved by working towards the five objectives described below.

4.2 Objectives

Objective 1: The community is prepared, active and has the resources to operate effectively.

Objective 2: Prevention of spread and early detection mechanisms are in place.

Objective 3: Outlying infestations are eradicated and other infestations are strategically managed.

Objective 4: Community willingness and capability to participate is increased.

Objective 5: Reporting and evaluation through a standardised monitoring programme is used to inform continuous improvement.

5 Strategic Actions

Key strategic actions identified as important to meeting each of the objectives of the management strategy together with timing and target outcomes are presented in Tables 2 to 6.

Table 2: Objective 1 – strategic actions.

Objective 1: The community is prepared, active and have the resources to operate effectively.		
Action	**When**	**Outcome**
• Maintain funding for a full time Project Manager to facilitate the management strategy and oversee the operations of the management committee.	• Ongoing	• Coordinated management will lead to more effective implementation of the strategy and a higher likelihood of positive outcomes.
• Maintain the executive committee structure and encourage wider community participation in the operations of the management committee.	• Ongoing	• A diverse and experienced group of participants leads to more informed decision making and better outcomes.
• Continually seek funding so that the vision for mesquite management in the Pilbara can be realised.	• Ongoing	• The community is better resourced to take action against mesquite.
• Actively promote the committee, raise awareness of mesquite and initiate and maintain partnerships and strategic alignment.	• Ongoing	• The awareness of mesquite and willingness to participate in the control and eradication of mesquite is increased. • Funds are used in a strategic and appropriate manner.
• Support the establishment of local contracting teams and promote standardised methodologies for mechanical and herbicide control.	• Ongoing	• Professional operators are trained and available to undertake mesquite control and eradication programs.

Table 3: Objective 2 – strategic actions.

Objective 2: Prevention of spread and early detection mechanisms are in place.		
Action	**When**	**Outcome**
• Prepare a mesquite ID guide and circulate within the region. Include early detection tools: seedlings and juveniles pre-flower. Identify habitats most at risk.	• Annually (at beginning of each year).	• Improved understanding of mesquite, increased identification skills across the community. • Increased detection and reporting capabilities.
• Promote public participation in reporting occurrences of mesquite.	• Ongoing	• Improved likelihood of detecting outlying occurrences of mesquite. • General public awareness increases profile of mesquite.
• Develop best hygiene practices to reduce the movement and spread of mesquite by livestock, soil and equipment.	• 2014	• Increased awareness of mesquite pathways of spread and increased knowledge on how to manage quarantine issues.

Objective 2: Prevention of spread and early detection mechanisms are in place.		
• Develop a surveillance program aimed at improving detection capabilities within at risk areas.	• 2014/2015	• Improved detection capability leading to more rapid detection and eradication of outlying (satellite) populations. • Rapid detection and eradication reduces the cost of the long term weed management programs.

Table 4: Objective 3 – strategic actions.

Objective 3: Outlying infestations are eradicated and other infestations are strategically managed.		
Action	**When**	**Outcome**
• Develop management zones and identify management responses based on a biosecurity approach (Figure 3).	• 2014	• Mesquite is strategically managed meaning that spatial areas can be prioritised. • Priority given to programs that prevent introduction or eradicate newly establishing outlying populations. • Reporting and evaluation on program effectiveness by management zone can be undertaken.
• Encourage eradication programs for all outlying populations of mesquite.	• Ongoing	• Core populations are contained. • There is an increased awareness of mesquite outside of the core infestation areas. • The potential for further spread is reduced.
• Support land managers to develop and implement mesquite action plans for their properties.	• Annually (at beginning of each year)	• Coordinated and consistent approach to managing mesquite at a local level. Action plans ensure appropriate action consistent with the strategy is taken and results can be properly measured and evaluated. • Provision of advice specific to property but standard to methods and implementation.
• Facilitate a coordinated, cross tenure approach to mesquite management by encouraging and facilitating partnerships.	• Ongoing	• Coordinated and consistent approach to mesquite management ensures that funds are used appropriately and in line with the broader strategy for mesquite.
• Inform all land managers of their obligations under the BAM Act.	• As required	• Consistent non-compliance can be referred to regulators for compliance driven action.

Table 5: Objective 4 – strategic actions.

Objective 4: Community willingness and capability to participate is increased.		
Action	**When**	**Outcome**
• Initiate and maintain partnerships with academic institutions and other expert consultant or science based Non-Government organisations.	• Ongoing	• Research partners are conducting research into mesquite which provides new social, biological and environmental control mechanisms. • Best practice is maintained as an important principle in the management of mesquite. • Information on mesquite management and research is current and relevant.
• Support land managers, including pastoralists, mining companies and others in obtaining resources and funding to implement mesquite management projects.	• Ongoing	• The knowledge of the extent and density of mesquite populations across the wider Pilbara community is increased. • The skills and capability of the community to manage mesquite is increased. • Areas actively treated are increased.
• Investigate funding sources on an ongoing basis.	• Ongoing	• The capability to implement the strategy on an ongoing basis is maintained. • Awareness of the strategy is increased.
• Implement a Communications Plan.	• 2014	• Key agencies, organisations, groups and the general public are aware of the strategy and the importance of the strategy to the Pilbara region.
• Recognise people and organisations for their ongoing support.	• Annually	• Increased willing community and stakeholder participation. • Increased performance of operators leading to improved outcomes for the management of mesquite.

Table 6: Objective 5 – strategic actions.

Objective 5: Reporting and evaluation is used to inform continuous improvement.		
Action	**When**	**Outcome**
• Encourage and support trials and research into different management approaches (for example control, surveillance, hygiene).	• Ongoing	• Best practice and a mantra of 'continuous improvement' is maintained as an important principle in the management of mesquite. • Continuous improvement leads to more effective use of resources and an improved return on investment.

Objective 5: Reporting and evaluation is used to inform continuous improvement.		
• Promote a standardised methodology for data capture and encourage submission of data into a centralised database.	• 2015	• Data from different sources is consistent and comparable. • Data is readily available for interrogation and evaluation. • Outcomes of management are readily demonstrable.
• Evaluate performance against the management strategy using the Australian Government natural resource management monitoring, evaluation, reporting and improvement framework (MERI) framework on an annual basis.	• Annually	• Monitoring and evaluation leads to results in an understanding of what 'works' and what 'doesn't work' and allows managers to adapt their plans. • The impact, appropriateness, effectiveness, and efficiency of programs can be measured. • Program evaluation promotes accountability and demonstrates a professional approach to mesquite management.
• Review and improve the management strategy as required.	• Annually	• The strategy continues to be relevant to the conditions at the time. • Planning for the future draws on lessons from the past. • Knowledge and understanding is captured from the lessons of past years.

6 Glossary

Table 7 provides the definition of abbreviations used throughout this document.

Table 7: Definition of abbreviations.

Abbreviation	Definition
AWC	Australian Weeds Committee
AWS	Australian Weeds Strategy
BAM Act	Biosecurity and Agriculture Management Act 2007
DAFWA	Department of Agriculture and Food Western Australia
DPaW	Department of Parks and Wildlife
DRDL	Department of Regional Development and Lands
ha	Hectare
IBRA	Interim Biogeographic Regionalisation for Australia
MERI	Australian Government natural resource management monitoring, evaluation, reporting and improvement framework
NRM	Natural resource management
PMMC	Pilbara Mesquite Management Committee
PMMS	Pilbara Mesquite Management Strategy
WoNS	Weed of National Significance
WA	Western Australia

Table 8 provides the definition of terms used through this document.

Table 8: Definition of terms.

Term	Definition
Asset	A natural resource that provides services (ecosystem services, production services or social services).
Biosecurity	The protection of the economy, environment and human health from the negative impacts associated with entry, establishment or spread of exotic pests (including weeds) and diseases.
Clean areas	Areas that have historically had mesquite occurrence and are now clean.
Containment	Where it is determined that a population cannot be eradicated, prevention of further spread may be required. Containment is a deliberate action taken to prevent establishment and reproduction of a species beyond a predefined area.
Control	In relation to organisms, this includes: – reducing the number of those organisms – preventing an increase in the number of those organisms – reducing the activity or appetite of some or all of those organisms – modifying the behaviour or characteristics of some or all of those organisms.
Core infestation	An established population from which spread and outlying populations are derived.
Eradication	When a species (including, for a plant, its propagules) has been removed or killed and no longer occurs at that site. In practice, this means that it can no longer be detected by recommended methods of survey for a defined period of time.

Term	Definition
Outlying infestation	Populations occurring outside the core infestations. Outlying infestations result from spread of established or core populations and are considered targets for eradication.
Potential distribution	The estimated area into which a particular species may spread in the absence of control or containment measures. This area is estimated based on the known environmental, climatic and physical preferences of the species.
Stakeholders	A person or group with a direct interest, involvement, or investment in something.
Pathways	The means by which propagules are moved. Possible pathways include wind, animals, equipment, people etc. The management of pathways of spread includes implementation of hygiene practices to minimise spread from one area to another. Also referred to as 'vectors'.

8 References

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