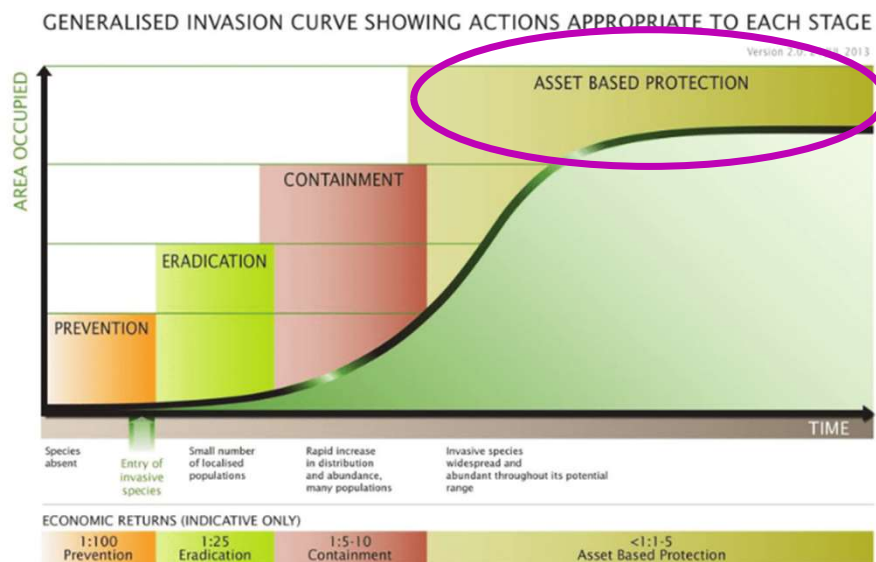


Mesquite Containment at Mardie Station

Asset protection – Control over scale

Lara Martin, DPIRD Biosecurity Office, Pilbara Region
WA Weeds Symposium 11 October 2023

Asset based protection – widespread and established species



- The single largest infestation of Mesquite in Australia is at Mardie Station in the Pilbara.

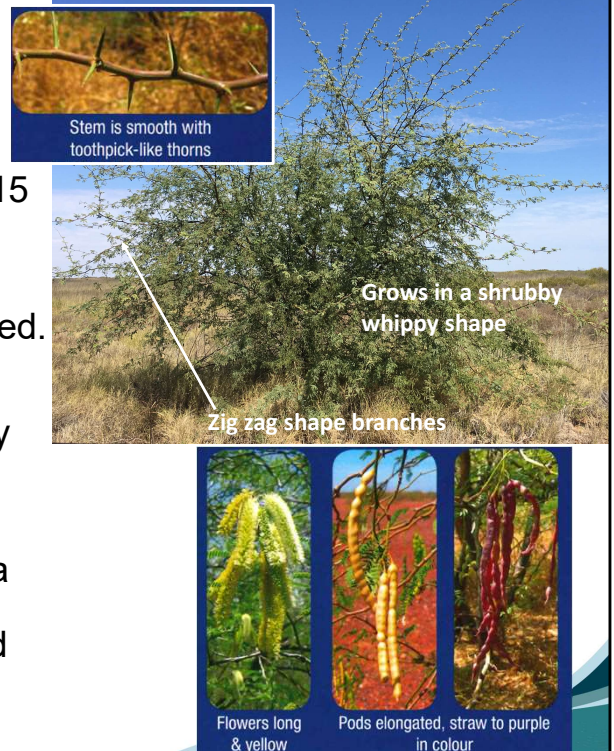
Covers ~150,000ha

Mesquite Containment at Mardie Station is at the upper end of the invasion scale and is focused on Asset protection where species are widespread and established.

It covers approx. 150,000ha of the station and is the single largest infestation of Mesquite in Australia (approx. 70% of the station).

What is Mesquite?

- Growth form varies from semi-prostrate, multi-stemmed shrub to single-stem tree, usually with whippy form. Height range 1-15 metres.
- Branches smooth, often zig-zag shaped. Toothpick like thorns range from 2–8 cm long. Creamy-yellow flower is finger shaped. Seed pods 5-20 cm long. Reproduces by seed or suckers.
- Long lived (30-40yrs), long seed-durability (hard seed dormancy 20yr+).
- In WA mostly hybrid *Prosopis* spp. (*P. glandulosa*, *P. glandulosa* × *P. velutina*, *P. pallida*). Recent reclassification, 6 genera (*Neltuma* / *Prosopis* spp).
- Declared pest (C2/C3) BAM Act 2007 and WoNS – invades rangelands.



Mesquite is a common name for several plants in the genus *Prosopis*, which contains over 40 species of small leguminous plants Native to North and South America.

They are mostly thorny and can be either a multi-stemmed shrub with branches drooping to ground level, or a single-stemmed tree with a spreading canopy that can grow to 15m in height.

Long lived species with long seed-durability of 20+yrs.

Branches are smooth, often zig-zag shaped with long yellow flowers and long seed pods.

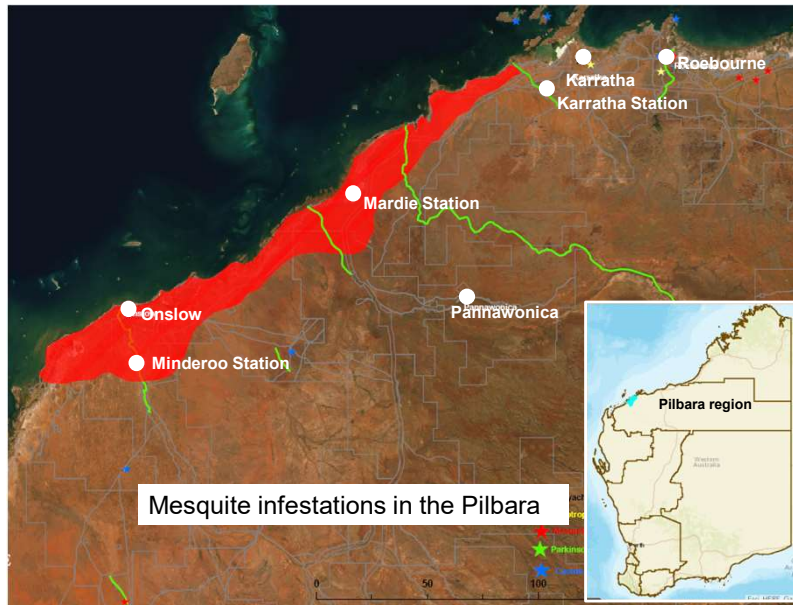
Reproduces by seed or suckers

In WA>most are now hybrid forms.

Nb. *Prosopis* sp have recently been reclassified to 6 genera, in WA the weedy ones and hybrids are now placed in *Neltuma* sp, with some hybrid taxa under *prosopis*.

Due to its invasiveness and subsequent ecological, economic and social impacts, all Mesquite are declared plants in WA and have been prioritised at a national level as Weeds of National Significance (WoNS).

How it got here and why it's a problem



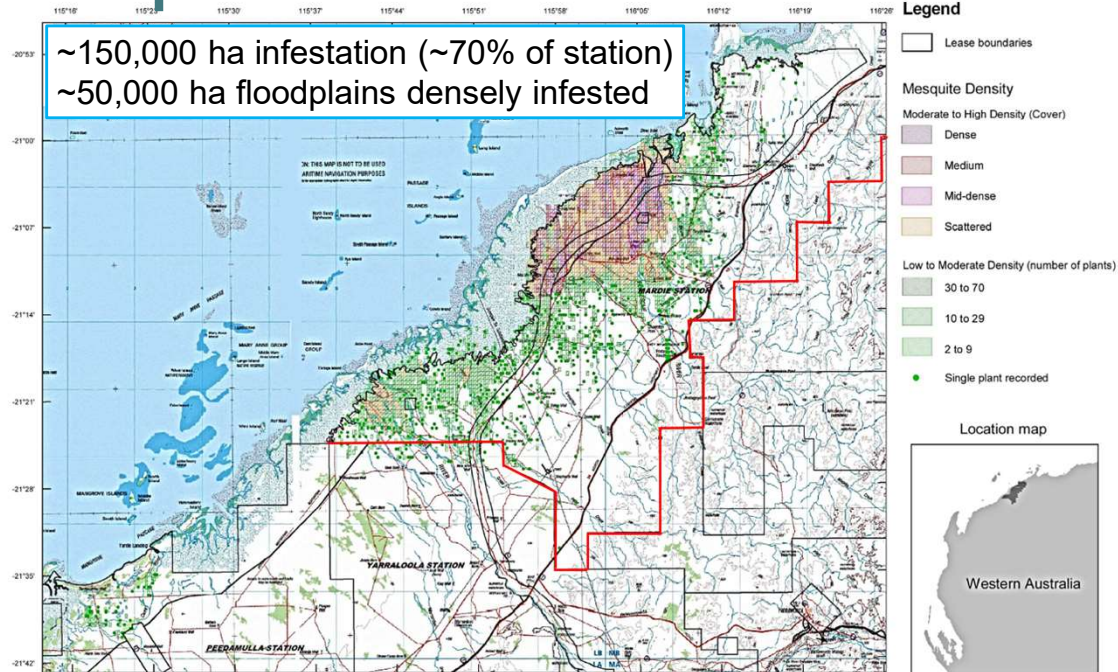
- Multiple mesquite species (now hybridised) were introduced from 1912 as shade trees in the West Pilbara.
- Mesquite currently covers ~250,000ha of coastal Pilbara region.
- It impacts on pastoral, biodiversity, community and cultural values due to highly invasive biology and scale of infestation.
- Precludes access, causes economic losses, degrades native ecosystems.

Multiple species (now hybridised) were introduced from 1912 as shade and fodder trees in the West Pilbara. It occurs densely at Mardie station and parts of Karratha Station down to Minderoo Station near Onslow and in varying densities on most tenure in the West Pilbara coastal area.

Mesquite currently covers ~250,000ha of coastal Pilbara region, with isolated infestations found across the Gascoyne and Kimberley Region.

Mesquite impacts on pastoral, biodiversity, community and cultural values due to their highly invasive biology and scale of infestation. It persists across an extensive range of complex land tenure (pastoral, mining, shire, UCL, DBCA managed) - degrading native ecosystems, precluding access and causing considerable economic and social losses.

Mesquite distribution: Mardie Station



A thornless variety of Mesquite (*Prosopis spp.*) was introduced on Mardie, early 1930's – 2 plants at the homestead planted as shade trees.

By the 1950's a dense infestation of hybrid mesquite had established and covered over 1000 ha and attempts began at controlling spread and eradicating the populations, both on Mardie and other properties in the Pilbara.

It's now covers over 150,000ha. Of this area 45-50,000 ha is considered to be medium to high density.

Impacts at Mardie: reduced pasture productivity, increased difficulty and expense mustering stock, damage to infrastructure (fencelines, water points, vehicle punctures), land degradation and loss of biodiversity (created monocultures).

Mardie is mixed tenure, running as a pastoral lease (mining company managed lease), with iron ore mining tenement sitting across this; and new developments for Salt mining in progress.

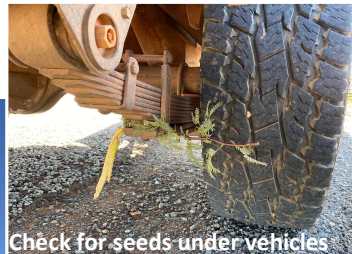
What does asset protection look like?

- Combined control methods – integrated weed management, trialling new techniques (incl. biocontrol)
- Work from the outside in (Sink to Source) – maintaining buffers and preventing spread.
- Manage animals in zones (infested/non-infested).
- Eliminate risk of vehicle movement (mud, seed fall).



Priorities at Mardie: 1. Prevention of spread

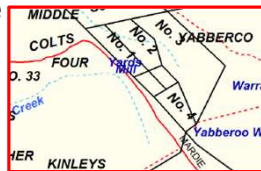
- Ensure no seed spread on vehicles, equipment and machinery – clean down
- Holding yards prior to moving stock (10 days) to prevent spread (including movements on the station and off station)
- Maintaining and keeping areas free of mesquite



Check for seeds under vehicles



Clean muddy vehicles



Yabbaroo Holding yards

DUE TO THE EXTENT OF THE INFESTATION, MARDIE HAS A DECLARATION STATUS OF CONTAINMENT. (rest of state=eradication requirements).

THE PRIORITY IS TO **PREVENT THE SPREAD** OF MESQUITE TO NEIGHBOURING PROPERTIES.

A combination of management tools and methods are used **To prevent spread,** INCLUDING

- Cleaning down of vehicles, equipment and machinery to minimise risk of spread – eg checking for seeds under vehicles, washdown
 - Maintain holding paddocks free of mature/adult seeding mesquite trees. WHICH ARE MONITORED FOR MESQUITE GERMINATION –& treated prior to maturity.
 - Ensure all cattle moving within and off the lease are held in these paddocks 10 days prior to movement (especially those in the heavy mesquite areas, to ensure those moving to mesquite free areas pass all mesquite seeds)
 - Maintaining and keeping 'clean' areas free of mesquite – in particular waters on the eastern side of NWC Hwy with prioritisation and control of these areas.
- Spot spraying/treating plants on regular bore runs and managing any plants in new areas early.

Priorities at Mardie: 2. Containment

- Maintaining tracks, fencelines, water points – using combinations of control techniques
- Maintaining buffers – 1-2km around the property boundaries and areas free of mesquite
- Prioritising areas for control: e.g. tracks, to allow remaining ‘open’



Containment: INCLUDING

Maintaining tracks, fencelines, water points = cleared areas along these areas (using combinations of control techniques, e.g mechanical removal around water-points with follow-up treatment of juvenile plants).

Maintaining buffers – 1-2km around the boundaries and areas free of mesquite

Prioritising areas for control: e.g. tracks, to allow remaining ‘open’. E.g. overgrown tracks mechanical removed.

Focusing control efforts in any new areas to prevent establishment (by treating juvenile plants)

E.g. this looks like:



Herbicide control – juvenile plants along tracks



Maintaining buffers

Annual control of tracks to reduce risk of spread - Spraying / maintaining buffers along roads/tracks, boundaries and monitoring areas free of mesquite

Control methods trialled

- Herbicides – basal bark, foliar spray, granules
- Mechanical removal – dozer, chaining, blade ploughing, excavator
- Biocontrol releases - Leaf tying moths, Bruchid seed feeders, sap-sucking psyllid

Chemical treatment

Basal bark treatment – highly recommended and widely used
 Cut stump treatment – limited application
 Foliar spraying treatment – very limited application
 Granular herbicide treatment – limited application

Mechanical

Blade ploughing/cutter bar attachments - recommended
 Dozing – limited application
 Chaining – not recommended

Fire / Biological



Herbicides – Basal bark spraying



Mechanical removal – adapted cutter bar on dozer



Biological control – Evippe spp

Numerous methods to eradicate and contain this infestation have been trialled at Mardie Station over the years. Some are more effective than others.

Herbicides – basal bark spraying (Triclopyr or Triclopyr+picloram in distillate) and foliar spray (Triclopyr or Triclopyr+picloram) of seedlings is the most common control method.

Mechanical removal (>300mm root removed to prevent regrowth) > adapted cutter bar on a dozer, blade plough or excavator removing individual trees have been most effective.

Biocontrol releases include leaf tying moths, Bruchid seed feeders and sap-sucking psyllids (released at Mardie Station and more widely across Pilbara populations late 1990s (CSIRO, DAFWA, PMMC)).

The most notable impacts observed are from LEAF-TYING MOTHS (*Evippe* spp) within the core hybrid infestation, REDUCING annual growth of plants in some areas and decrease seed pod production > doesn't kill the plants, and is slowing the mesquite infestation from becoming denser and spreading further into paddocks in which it currently inhabits. Bruchid seed-feeders (*Algoroborus prosopis* and *A. bottimeri*) are present in parts, but hard to assess impacts due high rates of predations of other herbivores (cattle, roos, emus)

Sap-sucking psyllid – *prosopidosylla flava* > not suitable in hotter climates, no establishment

Issues for Management

- Extent and large scale of infestation
- High cost to control at scale
- Difficulty of access in medium-dense infestations
- Long lived species and length of seed durability
- Flood events > increase movement and spread
- Movement by stock > ingestion (doesn't destroy seeds) and spread



- NO CONTROL EFFORT = untenable land dominated by thick impenetrable thickets of mesquite, habitat loss, loss of diversity
- Not a single station problem. The PMMC formed to assist with management of Mesquite in the Pilbara – allows best possible control and research programs on Mardie (and the Pilbara) for the long term

The effectiveness of current weed management programs in the area are diminished due to exceptionally large spatial and temporal scales and the onerous practicalities of management – including access difficulties.

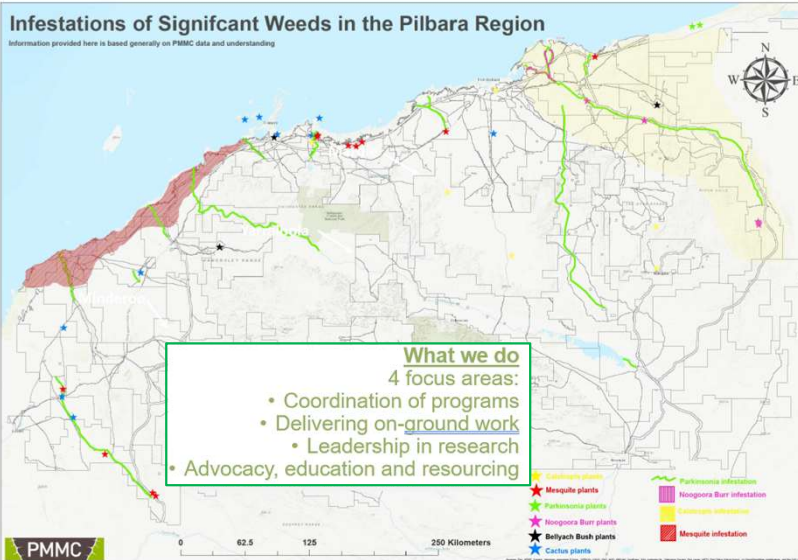
Due to longevity of plants and long seed durability best practice weed management requires methodical, long-term and often laborious work. This effort is expensive and when resources (time, money, people) are in high demand in other parts of the organisations, weed management is often not prioritised.

Flood events > Increase movement and spread. AS does MOVEMENT BY Stock > ingestion doesn't destroy seeds.

IF THERE'S NO CONTROL EFFORT.... It would result in untenable land...

PMMC FORMATION (April 2000) to assist with MGMT (out of this significant weed issue at Mardie)

The Pilbara Mesquite Management Committee



- Non-profit community group est. 2000 to coordinate and deliver integrated effective management of significant declared pest and WoNS weeds.
- Landscape scale weed management programs (delivery via PMMC, landholders and partnerships for funding).
- Consists of 8 Executive Members, and ~30 members from a range of land users/managers/organisations and a Project Manager

Not for profit group helps deliver integrated effective management of declared pest and WoNS weeds,
who FOCUS ON:

- Coordination of programs
- Delivering on-ground work
- Leading research
- advocacy, education and resourcing (RESOURCING = one of the biggest issues in remote areas)

Why does the PMMC exist?

The Pilbara is huge with lots of land users and stakeholders (often with conflicting values) and the weed infestations are large, occur over multiple tenure types, established, have complex ecology and are tricky to manage.

Within the land managers and stakeholders there is a disparity in understanding and management effort.

The PMMC aims to coordinate weed management efforts to achieve more appropriate, effective and efficient outcomes.

The Pilbara Mesquite Management Committee



Key partners

- Mining companies
- Local, State and Federal Govt
- Pastoral families, managers and companies
- Pilbara Regional Biosecurity Group
 - Rangelands NRM Group
 - MLA, CSIRO, UQ, KPCA
- TO Groups

What are the species?



Some of our partners.....

There several fabulous and amazing organisations that have on-going weeds control programs on their Pilbara tenure....



And there's a few more Landholders that the PMMC is trying to help become better weed mangers...

There's also a range of organisations that support the PMMC in other ways



PMMC manages several thousand \$ worth of on-ground pest weed management programs in the Pilbara each year.

Through key partners that have on-going weed control programs on their tenure (pastoralists, mining companies, local and state govt, TOs) and/or through ongoing funding or support in other ways, in particular Rangelands and state NRM, the Pilbara RBG, State and federal govt and other funding/research partners such as CSIRO, UQ, MLA, KPCA

Asset Protection and Containment

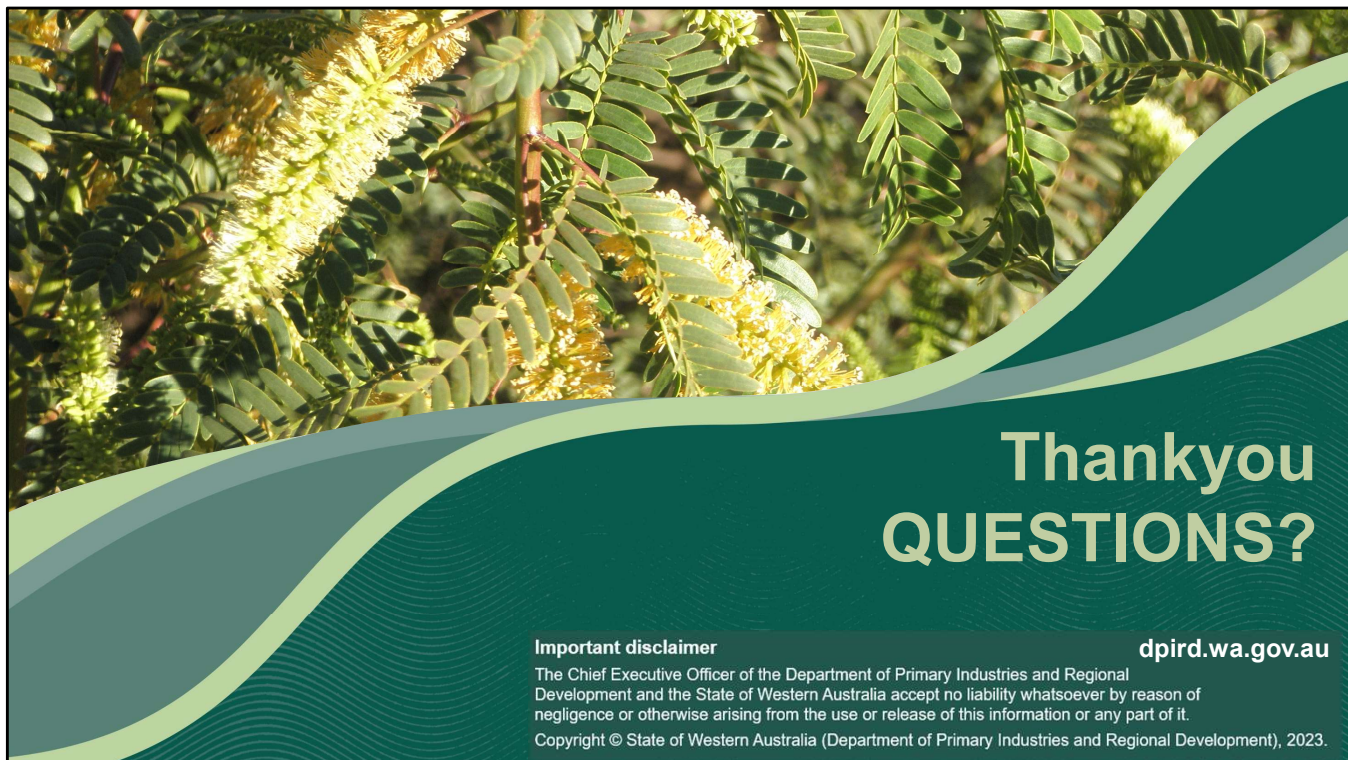
- Has been dependent on engagement and coordinated effort of Landholders.
- Commitment by the land managers to address the issue – using Integrated Management techniques for prevention/control.
- PMMC: Awareness raising to show what the problem can look like where such an invasive weed does get established at scale (i.e. what we don't want).
 - Capacity as a group to source funding to look at research and new methods of control.
 - Providing control options that have proven to work in the climatic Pilbara conditions (not all methods suit the dry climate).



- Developed tools and tips suited for the Pilbara conditions from the various methods trialled over many years.

While management efforts haven't reduced infestation area, it has slowed down the spread through prevention of movement of weed seeds through various means and prioritising control efforts to those areas still free of mesquite.

Coordinated efforts help continue with landscape scale management of invasive weeds.



Thankyou QUESTIONS?

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