



**Discussion Paper**  
Review of the 2015 Weed  
Management Plans for:  
Chinese Apple (*Ziziphus mauritiana*);  
Mesquite (*Prosopis* spp.) and  
Prickly Acacia (*Vachellia nilotica*)

**Rangelands Division**

Department of Environment and Natural Resources

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## Purpose of this paper

This paper is intended to inform the statutory review of the 2015 Weed Management Plans for Mesquite (*Prosopis* spp.), Prickly Acacia (*Vachellia nilotica*) and Chinese Apple (*Ziziphus mauritiana*).

We acknowledge all of the work that has previously been undertaken by individuals and organisations in preparing the current plans. We have prepared this paper to build on that work and seek feedback on our direction.

## How you can have your say

**Comments are now invited on the review of the 2015 versions of the Weed Management Plans for Mesquite (*Prosopis* spp.), Prickly Acacia (*Vachellia nilotica*) and Chinese Apple (*Ziziphus mauritiana*) from the community.**

There are various opportunities to have your say:

You may like to provide feedback via

- Completing an **online survey** at: <http://denr.nt.gov.au/open-for-consultation>
- Sending a **written submission** to The Director, Weed Management Branch, Department of Environment and Natural Resources

### **Statutory Weed Management Plans Review**

Weed Management Branch  
Department of Environment and Natural Resources  
PO Box 496  
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- **Emailing comments** to [weedinfo@nt.gov.au](mailto:weedinfo@nt.gov.au)

**PUBLIC COMMENT CLOSES: 17 May 2019**

# Contents

- Purpose of this paper**.....3
- How you can have your say** .....3
- Why do we need to review the plans?** .....5
  - 1 Introduction** .....5
  - 2 The review** .....5
  - 3 The weeds** .....6
    - 3.1 ..... What is mesquite?.....6
    - 3.2..... What is prickly acacia? .....6
    - 3.3..... What is chinee apple? .....7
- Focus areas for review** .....8
  - 4 Are we achieving the objectives of the plans?** .....8
  - 5 Have the plans facilitated better management outcomes?** ..... 14
  - 6 Is the class A declaration of mesquite, prickly acacia and chinee apple appropriate for the NT?** ..... 15
  - 7 Would enforcement of the plans improve outcomes?** ..... 16
- References** ..... 17

# Why do we need to review the plans?

## 1 Introduction

In the Northern Territory (NT), weeds, including mesquite, prickly acacia and chinee apple, contribute significantly to land and water degradation. They displace native flora, reduce productivity on pastoral land, take over sacred sites and compete with bush tucker on Aboriginal land, reduce wildlife habitat and access to waterways and some species can produce a haven for feral animals to flourish and hide.

All three of these weeds are declared Class A (to be eradicated) weeds in the NT.

The statutory Weed Management Plans for Mesquite (*Prosopis* spp.), Prickly Acacia (*Vachellia nilotica*) and Chinese Apple (*Ziziphus mauritiana*), (the plans), collectively known as prickly bushes, are recognised under the NT *Weeds Management Act 2001* (the Act) as providing direction to mitigate the impacts these weeds are having on Territorians, agricultural production, the economy and our environment.

The original plans were developed in 2012 and were reviewed in 2015 in accordance with the Act.

The Act describes the legislative requirements for weed management across the whole of the NT. Section 12 of the Act requires that statutory weed management plans must be reviewed within three years of their commencement.

## 2 The review

The review will take into consideration current Territory policy, future trends and developments, feedback from stakeholders and build on past achievements in order to determine current best practice management, respond quickly to new outbreaks and coordinate the management of existing infestations.

This paper takes into consideration some of the issues that need to be considered in the review. It is not meant to be conclusive, but rather to provide a starting point to encourage comment from land owners, land managers and other key stakeholders towards the review.

The review will be undertaken in two stages:

- **Stage 1** will consider how the plans are working, whether we are all reaching the targets identified in the plans, how the plans are used in alignment with legislation and whether any changes are required.
- **Stage 2** will include making any required changes to the plans from feedback and information gathered during the review, and gazettal of the updated plans (if required).

This paper relates to Stage 1 of the review program.

The NT Government is looking to receive feedback and submissions from industry, non-government organisations and individuals on the plans.

We will consider the information in Stage 1 to update the statutory plans and their future implementation.

### 3 The weeds

#### 3.1 What is mesquite?

Mesquite is a tree or multi-stemmed shrub around 5-10m high and is a Weed of National Significance (WoNS). It was introduced to Australia more than 100 years ago and is now present in all mainland states.

Pastoralism is the main land use in areas most susceptible to mesquite invasion. Severe mesquite infestations can reduce the production of native and introduced pasture species by up to 90%, resulting in a reduction in carrying capacity. Similarly increased costs associated with mustering and weed control can have large impacts on industry profitability. Thorns can injure animals and workers and also damage vehicle tyres. Mesquite also reduces environmental values such as biodiversity and ecological function, through the invasion and replacement of native plant communities and habitat for wildlife.



*Mesquite flower, stem and leaves.*

There are four species and several hybrids of *Prosopis*, which are collectively known as mesquite. The most problematic of these species in the NT is *Prosopis pallida*, however *P. velutina*, *P. glandulosa*, and *P. juliflora* are also declared weeds under section 7 of the Act.

#### 3.2 What is prickly acacia?

Prickly acacia (*Vachellia nilotica* syn. *Acacia nilotica*) is a thorny shrub or small umbrella-shaped tree that can grow to 10m and is a WoNS.

Prickly acacia was introduced into Australia prior to the 1900's. By the 1960's prickly acacia was being promoted as a shade and fodder tree. The agricultural production and environmental values across more than 6.6 million ha of Australia are now negatively affected by prickly acacia. Modelling indicates that up to 70% of Australia's mainland is at risk of prickly acacia invasion, including 50 million ha of Australia's Mitchell Grasslands. From an economic perspective, the thickets impede mustering, restrict movement of stock, cattle access to water and reduce pasture production.

Vast areas of central and northern Australia are susceptible to prickly acacia invasion, including ecologically and economically important areas of the NT. In the NT prickly acacia generally only occurs as scattered, isolated infestations. Relatively low level infestations occur on properties on the Barkly Tablelands and in the Katherine region. Outbreaks have occurred in Adelaide River and Batchelor, however these have been successfully eradicated.



*Prickly acacia infestation on the Barkly Tablelands.*

### 3.3 What is chinee apple?

Chinee apple (*Ziziphus mauritiana*) is a large shrub or small tree which grows to 8m tall with a spreading canopy that can reach to 10 m across.

*Ziziphus* species have been used internationally to reduce soil erosion and desertification rates, create wind breaks and to provide shade. Most spread in the NT can be attributed to deliberate plantings by humans for either shade or for the fruit, which are said to taste like a green apple. There are several varieties of chinee apple, some of which are grown commercially. Currently, only *Ziziphus mauritiana* is declared as a weed in the NT.

Chinee apple was first recorded in the Torres Strait in 1863, and in Townsville, Queensland in 1916. Chinee apple has since spread extensively across regions of the dry tropics in Queensland, growing most abundantly where native vegetation has been disturbed or removed. In suitable conditions chinee apple can form dense thickets, altering the structure and ecological integrity of native vegetation. Once established chinee apple can reduce the stocking rates of rangelands. Additionally the thorny thickets can impede mustering and restrict stock access to water.



*Chinee apple infestation in Queensland. Photo courtesy Barbara Madigan – Biosecurity QLD.*

## Focus areas for review

There are four main areas that will be assessed for review:

1. Are we achieving the objectives of the plans?
2. Have the plans facilitated better management outcomes?
3. Is the class A declaration of these weeds appropriate for the NT?
4. Would enforcement of the plans improve outcomes?

### 4 Are we achieving the objectives of the plans?

**Objective 1: To eradicate existing infestations and prevent further establishment of: mesquite, prickly acacia and chinee apple.**

Mesquite and prickly acacia are found in relatively low numbers across the NT. Both species have had numerous funding grants over the years to aid in their eradication with very successful results. Mesquite has almost been eradicated from the NT and progress is being made towards its eradication.

The NT Government is currently implementing a federally funded prickly acacia program. This program has aided strategic control works across the Gulf, VRD and Barkly regions, has allowed investigation of remote sensing opportunities to find prickly acacia in the wilds of outback NT so eradication of this weed can finally be completed and has provided a cost:benefit analysis tool for prickly acacia control for all landholders to use, increasing community capacity.

Table 1: Management requirements and targets for mesquite and prickly acacia.

Management requirement	Target
<ul style="list-style-type: none"> <li>• Eradicate established populations, isolated plants and outbreaks.</li> <li>• Implement early detection and management programs.</li> <li>• Design and implement a seed spread prevention program.</li> <li>• Prohibit the production, sale or purchase and transport of prickly acacia plants, seed or products.</li> </ul>	Property weed management plans are developed for all properties with either mesquite or prickly acacia infestations and submitted to the Weed Management Branch.
	Mature seeding trees have been eradicated and the production of seed and spread of mesquite and prickly acacia is prevented.
	All mesquite and prickly acacia infestations in the NT are under active eradication programs and number and size of infestations of mesquite and prickly acacia in the NT are reduced.
	Results of eradication activities are obtained from land holders, evaluated and reviewed.



### Questions to consider:

1. Do you have a control plan in place? Have you spoken to the Weed Management Branch about it? Do you need help with planning? How do you record your control efforts?
2. How have you gone with your control program? Are you targeting mature, seeding trees as a start? Have you seen any improvements from doing control work, either improved production or less weed spread?
3. Do you know it is illegal to transport weeds and weed seeds – this includes on cattle, trucks and machinery? Do you hold or quarantine cattle in paddocks that come across from Queensland for example, so you can monitor for spread/introduction of weeds such as prickly acacia, chinee apple or mesquite?

Chinee apple can be found across remote areas of the Top End of the NT and in town areas (like Darwin) in small numbers, however the largest infestations of chinee apple are in and around Katherine and Mataranka, and it is spreading. Being found in relatively low numbers in the NT does not mean that chinee apple is not a threat to our environment or pastoral production. The longer it is not controlled, the more it goes under the radar and before we know it, it has spread far and wide, and control becomes expensive and difficult. This may also be because people are still unaware of the potential impacts of chinee apple to riparian areas, grazing land and productivity.

Chinee apple to date has been difficult to manage due to its spread across a multitude of tenures. For this reason, and following the first review of the plan in 2015, management requirements and associated targets for chinee apple were broken up into tenures to make it easier for people to understand what was required on their own tenure or circumstance. Coordinating efforts with neighbours and across tenures is also a challenge in these scenarios, but with a little effort, can get some great results.

Table 2: Management requirements and targets for chinee apple – Multi-tenure and core infestations

Management requirements	Targets
<ul style="list-style-type: none"> <li>• Inspect your property and adjoining areas for any chinee apple plants or infestations.</li> <li>• Record the location of chinee apple plants or infestations.</li> <li>• Notify the Weed Management Branch if you find chinee apple.</li> <li>• Determine reasonable requirements for contribution to a strategic cross tenure eradication program.</li> </ul>	Landholders make use of education and extension materials and services provided by the Weed Management Branch for advice on chinee apple identification, survey, mapping, appropriate hygiene measures and legislative obligations.
	Stakeholders contribute to district or catchment programs to contain and reduce large infestations, prevent spread between properties and prevent expansion into clean areas.

<ul style="list-style-type: none"> <li>• Document and implement the strategic eradication program on your property.</li> <li>• Regularly monitor/survey land for new infestations or regrowth. Do this at least annually prior to flowering.</li> <li>• Record the results of chinee apple control to evaluate success.</li> <li>• Design, document and implement a weed spread prevention program.</li> </ul>	A weed spread prevention program is designed, documented and implemented to ensure that no new chinee apple infestations establish as a result of seed transfer or spread.
	Strategic, catchment wide eradication programs with assistance of the Weed Management Branch implemented.
	Record the results of chinee apple control to evaluate success and change or update control accordingly.
	Meet, discuss, share information and plan future works with neighbours and at community events.

Table 3: Management requirements and targets for chinee apple – Urban plantings (streetscapes, parks and suburban yards).

Management requirements	Targets
<ul style="list-style-type: none"> <li>• Inspect the property/area for any chinee apple plants or infestations</li> <li>• Record the location of chinee apple plants or infestations.</li> <li>• Notify the Weed Management Branch if you find chinee apple.</li> <li>• Advise the Weed Management Branch of any eradication works undertaken.</li> <li>• Record the results of chinee apple control to evaluate success.</li> <li>• Regularly monitor/survey land for new infestations or regrowth.</li> <li>• Utilise a qualified arborist to remove large trees.</li> <li>• Understand risks posed outside of urban settings.</li> </ul>	Landholders make use of education and extension materials and services provided by the WMB for advice on chinee apple identification, survey, mapping, appropriate hygiene measures and legislative obligations.
	Councils and land holders have contributed to a list of historic plantings.
	The Weed Management Branch has been provided with weed distribution information.
	Awareness campaign developed and implemented describing the risks chinee apple poses to the NT.
	Eradication programs developed and implemented across land ownership parcels.
	Lists of more appropriate trees to replace chinee apple have been created.
	Replacement tree species are investigated.

Table 4: Management requirements and targets for chinee apple – Market gardeners and farmers

Management requirements	Targets
<ul style="list-style-type: none"> <li>• Know your legal obligations to eradicate chinee apple.</li> <li>• Inspect your property for any chinee apple plants or infestations.</li> </ul>	Landholders make use of education and extension materials and services provided by the Weed Management Branch, including targeted campaigns for non-English speaking farmers, for advice on chinee apple identification, survey, mapping, appropriate hygiene measures and legislative obligations.

<ul style="list-style-type: none"> <li>• Record the location of chinee apple plants and notify the Weed Management Branch if you find chinee apple.</li> <li>• For commercial or buffer plantings, design, document and implement an eradication and replacement crop program to minimise production losses.</li> <li>• For wild harvest or unmanaged infestations, design, document and implement an eradication program.</li> <li>• Advise the Weed Management Branch of any eradication works undertaken.</li> <li>• Regularly monitor and survey land for regenerating trees or regrowth.</li> <li>• Design, document and implement a weed spread prevention program.</li> <li>• Do not sell chinee apple plants, seeds or fruit under any circumstances.</li> </ul>	Stakeholders are actively undertaking annual inspection, survey and mapping of chinee apple on their properties.
	Eradication and replacement programs have been implemented on properties.
	The Weed Management Branch has been provided with weed distribution information to assist with strategic planning for eradication works.
	Design, document and implement a weed spread prevention program, to ensure that no new chinee apple infestations establish as a result of seed transfer or spread.
	Landholders have removed all chinee apple from their properties and no longer have fruit to sell.
	Education and awareness campaigns are initiated at local and rural markets.

Table 5: Management requirements and targets for chinee apple – Indigenous communities

Management requirements	Targets
<ul style="list-style-type: none"> <li>• Know how to identify and control chinee apple and know your legal obligations regarding chinee apple.</li> <li>• Inspect your community for any chinee apple plants or infestations and determine your intended management.</li> <li>• Record the location of chinee apple plants.</li> <li>• Notify the Weed Management Branch if you find chinee apple.</li> <li>• For deliberate plantings and small infestations, eradicate all plants and replace with more appropriate bush foods.</li> <li>• For larger and spreading infestations, seek assistance and guidance from the Weed Management Branch on how to prioritise and control these infestations.</li> <li>• Advise the Weed Management Branch of any eradication works undertaken.</li> </ul>	Indigenous land managers make use of education and extension materials and services provided by the Weed Management Branch for advice on chinee apple identification, survey, mapping, appropriate hygiene measures and legislative obligations.
	Indigenous land managers are actively undertaking annual inspection, survey and mapping of chinee apple on their properties or in communities.
	Rangers drive removal and replacement programs on community and country.
	Design, document and implement a weed spread prevention program, to ensure that no new chinee apple infestations establish as a result of seed transfer or spread.
	Strategic eradication programs on community are documented and implemented.
	Training and information days are held on country.
	Record the results of chinee apple control to evaluate success of the control.

<ul style="list-style-type: none"> <li>Regularly monitor/survey land for new infestations or regrowth.</li> <li>Implement a weed spread prevention program.</li> </ul>	Meet, discuss, share information and plan with neighbours and at community events.
	Education and awareness campaigns of the risk chinee apple poses to the NT are developed and implemented – aim also at younger generations.
	A tree replacement program utilising the Jawoyn Bush Tucker Guide (2012) has been developed and implemented.

Table 6: Management requirements and targets for chinee apple – all other lands, transport and service corridors

Management requirements	Targets
<ul style="list-style-type: none"> <li>Inspect corridors for any chinee apple plants or infestations.</li> <li>Record the location of chinee apple plants or infestations.</li> <li>Notify the Weed Management Branch if you find chinee apple.</li> <li>Design, document and implement an eradication program.</li> <li>Advise the Weed Management Branch of any eradication works undertaken.</li> <li>Record the results of chinee apple control to evaluate success.</li> <li>Regularly monitor/survey land for new infestations or regrowth.</li> <li>Design, document and implement a weed spread prevention program.</li> </ul>	Landholders make use of education and extension materials and services provided by the Weed Management Branch for advice on chinee apple identification, survey, mapping, appropriate hygiene measures and legislative obligations.
	Stakeholders are actively undertaking annual inspection, survey and mapping of chinee apple.
	A weed spread prevention program, to ensure that no new chinee apple infestations establish as a result of seed transfer or spread has been designed, documented and implemented.
	The Weed Management Branch has been provided with weed data to assist with strategic planning.
	Stakeholders are actively engaging in cross property border chinee apple eradication programs.
	A strategic eradication program is implemented.
	Corridor managers recognise chinee apple as a priority weed, and strategic control of chinee apple is included in weed management tenders and contracts.
	Record the results of chinee apple control to evaluate success.

**Questions to consider:**

4. Have targeted awareness programs been implemented? Where? How? Were they successful? Has the community increased its capacity to identify and control chinee apple?
5. Have you controlled any chinee apple in the last three years? If no what is preventing you from controlling your chinee apple?
6. Have you contributed to a list identifying historic plantings of chinee apple in urban areas? Have the tree locations been recorded and data submitted to the Weed Management Branch?
7. What is the historic nature of the plantings and will it be an issue to remove the trees? Would replacing the trees with other species alleviate any issues?
8. Is there confusion as to what chinee apple is in the horticultural areas of the NT? Does there need to be some clarification on species and what is declared a weed and what isn't?

**Objective 2: To apply an adaptive approach to weed management.**

Monitoring and evaluation of programs allows us to determine if what we are doing is achieving our desired results, for whatever it is we have been working towards. Keeping accurate records of control and results from that control helps us to make that analysis. Sometimes it feels like we are losing the battle in weed control, but there are many battles we win. If we feel like we are losing, it may not be about the effort we are putting in, but something as simple as not applying the correct control methods at the right time, or at the right rate. Keeping records makes working these problems out much easier in the long run. If control has been done accurately, then this means something else may be happening, like herbicide resistance or even hybridisation of species which are less susceptible to certain control methods. When this happens, we have the opportunity to reassess our control options and adapt them to the new conditions.

Over the years, prickly acacia and mesquite have had a multitude of funds allocated for their eradication in the NT. Eradication is on track, however control efforts must be consistent. There have been instances where eradication has almost been achieved then no control has occurred for about five years and the infestation has exploded again, making control expensive and laborious. Adapting your approach to managing weeds on your property will ensure control works don't have to be redone and your effort is not wasted.

No NT Government dedicated funding has been provided for chinee apple control or cross-tenure projects, however, some departments are controlling chinee apple through their annual weed control programs.

Table 7: Management requirements for adapting approaches to weed management

Management requirement	Target
<ul style="list-style-type: none"> <li>• Develop and maintain an ongoing monitoring program</li> <li>• Maintain an accurate record of control methods applied and results achieved for possible collation at a Territory level</li> <li>• Evaluate the efficacy of control and containment programs</li> </ul>	A monitoring program should be developed on all properties/land parcels with existing or historical mesquite, prickly acacia or chinee apple infestations. A monitoring and management report should record the type and location of all management actions undertaken, including active control, survey works and spread prevention. The result of these actions should be recorded, even if the desired result was not achieved.
	A monitoring and management record, which includes current and past weed locations, shall be produced when requested by the Weed Management Branch.
	Determine the success of various management actions employed and use this information to fine tune the performance of your management program.

### Questions to consider:

9. Do you keep records of your control efforts? Do you submit this information to the Weed Management Branch?
10. Have you changed the way you do control works from evaluating and assessing things when it hasn't worked?
11. Have you seen mesquite, prickly acacia or chinee apple infestations reduce or increase on your property? Why?

## 5 Have the plans facilitated better management outcomes?

We need to determine if the plans are facilitating this the aim of the plans, which is to negate the damage caused by mesquite, prickly acacia and chinee apple to the natural environment and the NT economy, social and cultural land uses. This can be indicated by a number of factors. Are we achieving eradication, containment, spread prevention and reduction in infestations across the NT?

### Questions to consider:

12. Are you implementing weed spread prevention programs? How are they implemented? Are you seeing results from implementing this?
13. Do the plans have enough information for landholders to manage these weeds as per their requirements?

## 6 Is the class A declaration of mesquite, prickly acacia and chinee apple appropriate for the NT?

Weed risk assessments of all three weeds have been conducted by the Weed Risk Management Technical Committee, using the Weed Risk Management System.

The assessments determined prickly acacia and chinee apple to have a weed risk of 'very high' in the NT with a 'very high' feasibility of control, and mesquite to a 'very high' weed risk with a 'high' feasibility of control. The assessments resulted in mesquite, prickly acacia and chinee apple being declared as class A weeds across the whole of the NT. This means that eradication is a realistic or feasible option in the NT.

All three of these weeds are found in very low numbers in the NT, but other areas of Australia are heavily infested and are suffering the consequences. Valuable pastoral lands have been taken over by these weeds and some areas have no feed left at all for cattle. Control is immensely difficult and expensive due to the wide spread nature of the infestations. In Queensland, over 6.6 million ha of land is covered by prickly acacia and in Western Australia, a similar plight faces much of the Pilbara with mesquite now hybridising, making it extremely difficult to manage.

### Questions to consider:

14. What or who do you believe is most important to the success of controlling mesquite, prickly acacia or chinee apple? Why?
15. Have you learnt anything over the last few years that has changed the way you think about controlling mesquite, prickly acacia or chinee apple?



*Prickly acacia infestations cover the landscape in Julia Creek in Central Western Queensland.*



*Mesquite infestation in the Pilbara (photo courtesy of the Pilbara Mesquite Management Committee 2015).*

## **7 Would enforcement of the plans improve outcomes?**

The weed management plans for mesquite, prickly acacia and chinese apple are statutory documents. The management requirements listed in the plans are legal obligations for all those with any of these weeds on their land. Being statutory documents, the plans need to be capable of being used for enforcement and compliance activities by the Weed Management Branch.

Requirements in the plans need to be fair and reasonable and in the event of non-compliance with the plans, it is necessary to determine if the plans are legally sound. Are they easy to follow? Are the requirements obvious, measurable and reasonable to implement? This review will look at those elements to determine if management requirements need to be clearer, if the plans are suitable for their intended use and if they can be used as a fair target to measure compliance against.

If the requirements in each of the plans are fair and reasonable, and the plans are enforced on non-compliant landholders or occupiers, the plans would improve the situation on-ground and reduce the impact these weeds are having on the NT.



### Questions to consider:

16. Are the plans suitable for their intended use (i.e. negating the impact mesquite, prickly acacia and chinee apple are having on the NT)?
17. Can the plans be used to measure compliance? If not, what is required to allow this?

## Issues identified already

Issues identified	What we are considering
The plans have similar or the same management requirements.	Possible amalgamation of two or three of the plans as all three weeds are declared Class A in the NT, are primarily found in similar regions and have the same target of eradication.
There are no timeframes set against targets other than the weeds should be eradicated within the life of the plan – 10 years.	Set targets with specific timeframes, more frequent than 10 years.
Information on catchment planning and landscape scale management should be included.	Add general information to the plan on smaller scale catchment planning.
The objectives are simple and there are no goals in the plans.	Reassess the objectives of the plans and identify some goals to be reached.
Species concern – there has been some confusion as to different species of chinee apple within the Top End and what is considered to be a declared weed, and what isn't.	A new Weed Risk Assessment on chinee apple will need to occur and will focus on risk of <i>Ziziphus mauritiana</i> subspecies to determine accurate declaration of species.
Expectations on land managers/owners are too costly or not as clear as they could be.	Simplify requirements and make required actions very clear.

## References

- Northern Territory Government: Northern Territory Weed Data Collection Manual, [www.nt.gov.au/weeds](http://www.nt.gov.au/weeds)
- Northern Territory Government: *Northern Territory Weeds Management Act 2001*  
<http://www.nt.gov.au/nreta/natres/weeds/legislation/index.html>
- Northern Territory Government: Weed Management Plan for Mesquite (*Prosopis* spp.) 2015
- Northern Territory Government: Weed Management Plan for Prickly Acacia (*Vachellia nilotica*) 2015
- Northern Territory Government: Weed Management Plan for Chinee Apple (*Ziziphus mauritiana*) 2015
- Northern Territory Government: Katherine Regional Weed Management Plan 2015-2020
- Northern Territory Government (2015): Barkly Regional Weed Management Plan