

# Weed Management Plan for Chinese Apple (*Ziziphus mauritiana*) 2015



## **Rangelands Division**

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**Cover photos:** Main: Chinee apple infestation in QLD (Biosecurity QLD),  
Inset: Chinee apple leaf and flower

## Executive summary

This Weed Management Plan forms part of a strategic approach to chinee apple (*Ziziphus mauritiana*) management in the Northern Territory with the overall aim being to negate damage caused by chinee apple to the natural environment and the Northern Territory economy.

A weed risk management assessment found chinee apple to be a very high risk weed where potential exists for successful management. On the basis of this assessment chinee apple has been declared under the *Weeds Management Act* (the Act) as:

Class A: **To be eradicated**, in all areas of the Northern Territory; and

Class C: **Not to be introduced** into the Northern Territory.

In all instances Class A weeds are also classified as Class C.

This Plan establishes the objectives and outcomes to be achieved by land managers and the minimum actions to be taken to achieve these outcomes. Conducting land management practices in accordance with the final Plan will secure compliance with the requirements of the Act with regards to chinee apple management.

This Plan also incorporates *best management practice* goals which will ultimately contribute to strategic weed control at a Territory scale. Information on a range of management techniques and control methods, including physical and chemical control and hygiene procedures, is included.

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# 1. Introduction

## 1.1 Background

Chinee apple (*Ziziphus mauritiana*) is native to southeast Asia and eastern Africa. It is a large shrub or small tree which grows to 8 m tall with a spreading canopy that can reach to 10 m across. Chinee apple produces small, cream coloured flowers up to 8 mm wide which have an unpleasant odour. The edible fruits turn from green to yellowish-orange when ripe, gradually drying to purplish-black.

*Ziziphus* species have been used internationally to reduce soil erosion and desertification rates, create wind breaks and to provide shade. Leaves and stems provide highly nutritional fodder for livestock. Dispersal is aided by birds, domestic stock, and feral pigs that eat the fruit and void the seeds in their droppings. Most spread in the Northern Territory can be attributed to deliberate plantings by humans for either shade or for the fruit, which are said to taste like a green apple.

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.

Given the level of risk posed by chinee apple and the relatively limited level of establishment in the Northern Territory, eradication has been determined to be a management priority. Significant effort will need to be put into identifying and mapping existing infestations (particularly in remote areas), communicating the risks associated with chinee apple spread and implementing strategic control as soon as possible.

## 1.2 Period and application of Plan

The original Plan, being the *Weed Management Plan for Chinee Apple (Ziziphus mauritiana) 2012*, was reviewed and has been updated in 2015 in accordance with section 10 of the *Weeds Management Act*. This updated Plan applies to the whole of the Northern Territory and specifies the minimum requirements for managing chinee apple. It applies to all landholders, including the Territory Government. This Plan takes effect from 23 December 2015. It must be reviewed within three years of this date and will cease ten years from that date, unless replaced by a revised plan.

Management obligations from the original Plan have been reviewed. Requirements specified in this Plan should now be observed by all landholders.

Meeting the objectives set out in this Plan is important for long term eradication of chinee apple in the Northern Territory. Landholders are required to meet the management requirements outlined in the Plan in order to secure compliance with the Act. Penalties of between 77 and 770 penalty units (\$11 781 and \$117 810) for individuals and between 385 and 3850 penalty units (\$58 905 and \$589 050) for a body corporate apply for failure to comply with this Plan\*.

\* Penalty units are determined by the *Penalty Units Act*. As at 1 July 2015 the *Penalty Units Regulations* prescribed the monetary value of a penalty unit as \$153.

### 1.3 Coordinated management

This Weed Management Plan was developed with broad stakeholder consultation. It provides strategic management directives which are intended to mitigate the economic and environmental risks posed by chinee apple.

The Department of Land Resource Management (DLRM) will work closely with stakeholders, including other government departments, to implement and monitor the performance of this Plan. Continued improvement will be made possible through a commitment to regularly review the Plan and make changes where necessary.

## 2. Aim and objectives

### 2.1 Aim

**To negate the damage caused by chinee apple to the natural environment and the Northern Territory economy by:**

- increasing community awareness of chinee apple and its impacts;
- providing clear and measurable management targets (refer section 5);
- defining the management requirements applicable to all land managers and land users in the Northern Territory, which collectively contribute to the strategic management of chinee apple across the Northern Territory and Australia; and
- providing information on actions required to meet management obligations.

### 2.2 Management objectives

**1. To eradicate all existing infestations and prevent further establishment of chinee apple in the Northern Territory:**

- a) eradicating all isolated plants, (including deliberately planted trees and outbreaks);
- b) implementing early detection and eradication programs for all infestations;
- c) designing and implementing a spread prevention program; and
- d) prohibiting the production, sale or purchase and transport of chinee apple plants, fruit, seed or products.

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

- a) developing and maintaining an ongoing monitoring program;
- b) maintaining accurate records of control methods applied and results achieved for analysis at property, regional, Territory and national scales; and
- c) evaluating the efficiency of control and containment programs over time.

### 2.3 Targets

Chinee apple management is an ongoing process. This Plan outlines a number of targets that aim to assist all land users to measure the effectiveness of the management objectives over the life of the Plan (refer Appendix B).



### **3. Chinese apple declaration status**

#### **3.1 Declaration**

Chinese apple is declared under section 7 of the Act as:

- **Class A (to be eradicated)** in all areas of the Northern Territory.
- **Class C (not to be introduced)** to all areas of the Northern Territory.

#### **3.2 Northern Territory Weed Risk Management System**

The Territory Government uses the Northern Territory Weed Risk Management System to identify and prioritise plants to be declared as weeds in accordance with the Act and to determine the appropriate management requirements for those plants. The chinese apple declaration status is consistent with the results of the risk assessment process, that being a very high risk weed with a very high feasibility of control in both the Darwin and Katherine regions.

For management to be effective, the restriction of spread must be prioritised. The whole of the Northern Territory is classified as Class C, so therefore no chinese apple is to be introduced into any area within the Northern Territory.

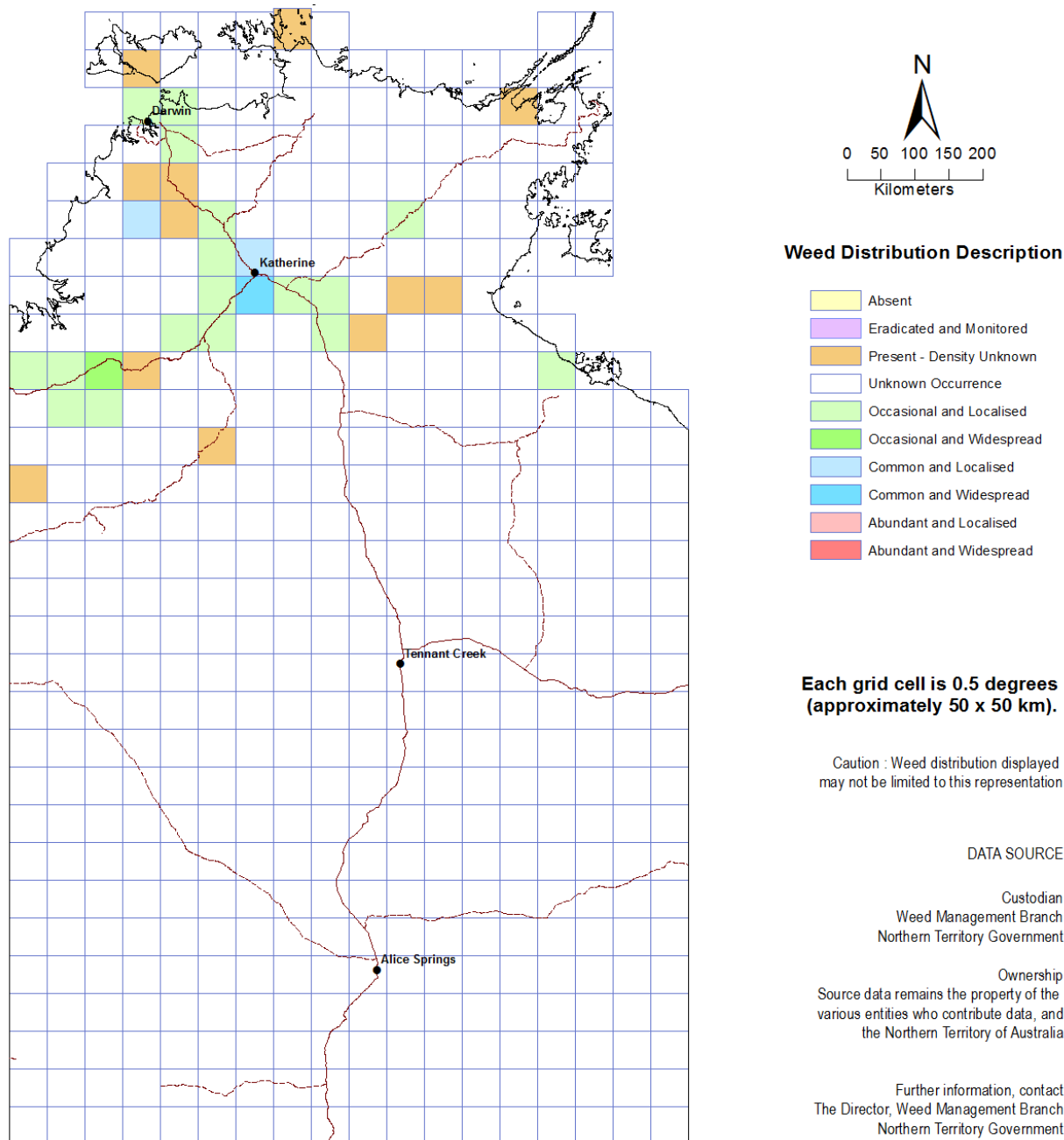
### **4. Current distribution**

In the Northern Territory chinese apple occurs as scattered, isolated infestations across a variety of tenures including pastoral land, Indigenous, and crown managed land. There are also many examples of deliberate plantings in urban gardens, homesteads and remote community settings, some of which have spread far beyond original planting sites.

Some higher density incursions have developed in association with small tributaries of the Katherine, Roper, McArthur and Victoria Rivers in the Katherine Region. There are also known infestations at Bing Bong Harbour.



**Figure 1: Known distribution of chinee apple in the Northern Territory  
(Weed Management Branch 2015)**



## 5. Management requirements

### 5.1 Introduction

The actions detailed below have been identified as the minimum acceptable requirements needed to achieve the objectives sought and compliance with this Plan. Landholders may choose to implement a higher level of management than is required by this plan e.g. a landholder may seek to remove mature trees from urban plantings, a solution which is highly beneficial from a strategic management perspective as it removes the seed source.

### 5.2 Eradication (Class A)

Land managers and land users throughout the Northern Territory are required to actively identify and eradicate all chinee apple infestations and prevent new infestations establishing.

The tables following, describe the management requirements necessary to eradicate chinee apple in five different management situations. Management requirements vary based on the extent and location of chinee apple establishment, its potential for spread and the deliberate nature of some plantings. Land managers should determine which table is most applicable to their situation and address the actions accordingly.

1. Urban plantings – Generally isolated trees historically planted for shade, fruit or aesthetics
2. Multi tenure and core infestations – Wild chinee apple infestations that have resulted from inadvertent spread
3. Market gardeners and farmers – Deliberately planted trees intended for fruit harvest or vegetation buffers
4. Indigenous communities - Deliberately planted trees intended for fruit harvest and/or wild chinee apple infestations that have resulted from inadvertent spread
5. Transport and service corridors - Infestations that have resulted from inadvertent spread, generally in linear corridors with high risk of further spread

#### 5.2.1 Urban plantings (streetscapes, parks and suburban yards)

1. **Inspect the property/area** (including any previously treated areas) for any chinee apple plants or infestations.
2. **Record the location of chinee apple plants or infestations** in accordance with the [Northern Territory Weed Data Collection Manual](http://www.nt.gov.au/weeds) (available at [www.nt.gov.au/weeds](http://www.nt.gov.au/weeds)).
3. **Notify the Weed Management Branch** if you find chinee apple and of your intended management.
4. **Organise tree removal** in accordance with section 6 or by engaging a qualified arborist.
5. **Advise the Weed Management Branch** of any eradication works undertaken.
6. **Record the results of chinee apple control to evaluate success.** Submit your results to the Weed Management Branch. Records should be in a format consistent with the example provided at Appendix A.
7. **Regularly monitor/survey land for new infestations or regrowth.** Do this at least annually prior to fruiting (generally January to August) to allow for control work to be undertaken prior to fruit production. (Reproductive events may vary depending on the environment and rainfall.)

### 5.2.2 Multi tenure and core infestations

1. **Inspect your property/adjoining areas** (including any previously treated areas) for any chinee apple plants or infestations.
2. **Record the location of chinee apple plants or infestations** in accordance with the [Northern Territory Weed Data Collection Manual](http://www.lrm.nt.gov.au/weeds) (available at [www.lrm.nt.gov.au/weeds](http://www.lrm.nt.gov.au/weeds)).
3. **Notify the Weed Management Branch** if you find chinee apple and of your intended management.
4. Work with the Weed Management Branch to **determine reasonable requirements for contribution to a strategic cross tenure eradication program**.
5. **Document and implement the strategic eradication program** on your property using control methods detailed in section 6.
6. **Regularly monitor/survey land for new infestations or regrowth**. Do this at least annually prior fruiting (generally January to August) to allow for control work to be undertaken prior to fruit production. (Reproductive events may vary depending on the environment and rainfall).
7. **Record the results of chinee apple control to evaluate success**. Submit your results to the Weed Management Branch to allow strategic planning at a Territory level. Records should be in a format consistent with the example provided at Appendix A.
8. **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 (refer section 7).
9. **Evaluate and review** the strategic eradication program every two years in collaboration with the Weed Management Branch.

### 5.2.3 Market gardeners and farmers

1. **Know your legal obligations to eradicate chinee apple**. Seek advice from the Weed Management Branch if you are unclear.
2. **Record the location of chinee apple plants or infestations** in accordance with the [Northern Territory Weed Data Collection Manual](http://www.lrm.nt.gov.au/weeds) (available at [www.lrm.nt.gov.au/weeds](http://www.lrm.nt.gov.au/weeds)).
3. **Notify the Weed Management Branch** if you find chinee apple and of your intended management.
4. **For commercial or buffer plantings**, design, document and implement an eradication and replacement crop program to minimise production losses.
5. **For wild harvest or unmanaged infestations**, design, document and implement an eradication program using control methods detailed in section 6.
6. **Advise the Weed Management Branch** of any eradication works undertaken.
7. **Regularly monitor/survey land for new infestations or regrowth**. Do this at least annually prior to fruiting (generally January to August) to allow for control work to be undertaken prior to fruit production. (Reproductive events may vary depending on the environment and rainfall.)
8. **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 (refer section 7).
9. **Do not sell** chinee apple plants, seeds or fruit under any circumstances.

#### 5.2.4 Indigenous communities

1. **Know how to identify and control chinee apple and know your legal obligations** regarding chinee apple. Seek advice from the Weed Management Branch if you are unclear.
2. **Inspect your community** for any chinee apple plants or infestations and of your intended management.
3. **Record the location of chinee apple plants or infestations** in accordance with the [Northern Territory Weed Data Collection Manual](#) or [Field Guide for Mapping Weeds](#) (available at [www.lrm.nt.gov.au/weeds](http://www.lrm.nt.gov.au/weeds)).
4. **Notify the Weed Management Branch** if you find chinee apple.
5. **For deliberate plantings and small infestations**, eradicate all plants using control methods detailed in section 6 and replace with more appropriate bush foods (refer to the *Banatjarl Useful Plants and Bush Tucker Garden Report* prepared for the Jawoyn Association by Team Savanna) .
6. **For larger and spreading infestations**, seek assistance and guidance from the Weed Management Branch on how to prioritise and control these infestations.
7. **Advise the Weed Management Branch** of any eradication works undertaken.
8. **Regularly monitor/survey land for new infestations or regrowth.** Do this at least annually prior to fruiting (generally January to August) to allow for control work to be undertaken prior to fruit production. (Reproductive events may vary depending on the environment and rainfall.)
9. **Implement a weed spread prevention program**, to ensure that no new chinee apple infestations establish as a result of seed transfer or spread (refer section 7). This may involve requesting community members don't eat fruit or throw seeds on the ground.

#### 5.2.5 Transport and service corridors (managers, owners and developers)

1. **Inspect your property/area** (including any previously treated areas) for any chinee apple plants or infestations.
2. **Record the location of chinee apple plants or infestations** in accordance with the [Northern Territory Weed Data Collection Manual](#) or [Field Guide for Mapping Weeds](#) (available at [www.nt.gov.au/weeds](http://www.nt.gov.au/weeds)).
3. **Notify the Weed Management Branch** if you find chinee apple and of your intended management.
4. **Design, document and implement an eradication program** using control methods detailed in section 6.
5. **Advise the Weed Management Branch** of any eradication works undertaken.
6. **Record the results of chinee apple control to evaluate success.** Submit your results to the Weed Management Branch. Records should be in a format consistent with the example provided at Appendix A.
7. **Regularly monitor/survey land for new infestations or regrowth.** Do this at least annually prior to fruiting (generally January to August) to allow for control work to be undertaken prior to fruit production. (Reproductive events may vary depending on the environment and rainfall.)
8. **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 (refer section 7).

### 5.3 Preventing spread

All land users must ensure there is no further spread within or into the Territory.

#### 5.3.1 All land users

1. If you have chinee apple on your property you must develop and implement a weed spread prevention program that will ensure that no new chinee apple infestations can establish as a result of seed transfer or spread (refer section 7)
2. You must not transport, sell, buy or propagate chinee apple plants or seed within the Northern Territory.
3. Where chinee apple plants are yet to be controlled and are producing fruit, the fruits, and in particular the seeds/pips, must not be transported or disposed of in a manner which may allow germination or spread.

### 5.4 Permits

Section 30 of the *Weeds Management Act* enables an owner or occupier of land to apply to the Minister for a permit to use a declared weed. The Minister may refuse or grant a permit subject to a range of conditions. An owner or occupier of land can therefore apply for a permit to retain deliberate amenity plantings of chinee apple, such as those found around communities, when they present a very low risk of spread.

Before a permit can be issued, the tree or trees in question would need to be assessed for risk of spread by Weed Management Officers. If plantings are determined to pose a low risk, the owner or occupier may be able to apply to the Minister for Land Resource Management for a permit, subject to conditions. The conditions would stipulate strict monitoring and a requirement that any chinee apple seedlings in the area are immediately eradicated. Permits will be valid for a period of five years after which they would need to be reviewed. Permits may only be renewed if no new plants are found in the vicinity or downstream of the permitted planting. If uncontrolled spread is occurring, the permit may be revoked at any time and the mature trees must be removed.

## 6. Eradication and control methods

### 6.1 General

Effective chinese apple management is dependent on the application of an integrated natural resource management approach. Weed control will be more successful where land managers are also implementing appropriate grazing regimes, managing feral animals and controlling erosion and fire on their properties.

It is recognised that successful weed management outcomes may take time and repeated effort to become clear. Effective control, particularly in rangeland situations, will require the development of a long term management plan, which takes into account any existing seed bank which may have accumulated in the soil. The results of a strict management program will become more evident with each application.

#### 6.1.1 Integrated weed control

Integrated weed control, that involves using a combination of control techniques to manage weeds, can result in more effective longer term weed management outcomes. However given the low density of chinese apple infestations in the Northern Territory and the vast areas which are affected, herbicide application is considered the most effective and economical management method.

Table 1 demonstrates how the type and density of a chinese apple infestation should be taken into account when determining the most suitable control options.

**Table 1: Control options for chinese apple (*Ziziphus mauritiana*)**


Control option	Situation				
	Low density <sup>1</sup>	Medium density <sup>2</sup>	High density <sup>3</sup>	Creeks and rivers <sup>4</sup>	Seedlings
Basal bark spraying	✓✓✓	✓✓	✓	✓✓	✓✓
Cut stump	✓✓	✓	✓	✓✓	
Foliar spraying					✓✓✓
Grubbing – dozer pushing	✓✓✓	✓✓	✓		
Grubbing – stickraking		✓✓	✓✓		
<b>Best management suggestion</b>	<b>Basal bark</b>	<b>Basal bark</b>	Not applicable in the NT	<b>Basal bark, cut stump</b>	<b>Foliar spraying</b>

#### Key

✓ low suitability of control

✓✓ moderate suitability of control

✓✓✓ very good suitability of control

 Not applicable - Physical removal is generally cost prohibitive for widespread and low density infestations, such as those found in the Northern Territory.

#### Density levels

**1 - Low density** <50 plants/ha

**2 - Medium density** 50–150 plants/ha

**3 - High density** >150 plants/ha

**4 - Creeks and river** - Refers to infestations growing in association with a watercourse or water body (i.e. on the banks or in the dry bed, but not growing in the water itself). Any application of herbicides to trees growing in association with a watercourse or water body must comply with the herbicide manufacturer's specifications. Due to the potential for high seedling emergence, the risk of soil erosion and other catchment protection issues, mechanical control is not recommended in these situations

### 6.1.2 Property management planning and mapping

It is recommended that all land holders who have declared or problematic weeds on their land develop a property weed plan, which includes a detailed assessment of all infestations on the property. The assessment will enable consideration of the current distribution of the weed, the potential for spread (along water courses, access tracks/roads, animal movement etc) and potential impacts on land use and other values such as biodiversity. Once this information is collated, priority control areas and suitable control methods can be identified.

A property weed plan should detail exactly what is required to meet, or exceed, all requirements of this statutory weed management plan, and any other weed management requirements which may be applicable to a certain property or area

### 6.1.3 Timing weed control

The growth and reproductive cycles of a weed species must be taken into account when developing a management program. Implementing control measures at the wrong time of year can significantly reduce both the short and long-term success of the management action, consequently increasing necessary investments. Table 2 provides an overview of chinee apple growth and reproduction and corresponding times for control options. It is always best to control weeds prior to seed set or fruiting to prevent more establishment.

Generally, with chinee apple, there is a window of two to five years before first seed set . On a limited, but recurrent budget, older trees should be controlled first to minimise the production of fruit and subsequent seed source. Seedlings and juveniles can be controlled in the following years' budgets, particularly where there is a large seed bank

**Table 2: Guide to the management of chinee apple in the Northern Territory**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Flowering	Striped	Striped	Striped	Striped	Striped	White	White	White	White	White	White	White
Fruiting	Striped	Striped	Striped	Striped	Striped	Striped	Striped	Striped	White	White	White	White
Germination	White	White	White	White	White	White	White	White	White	White	Striped	Striped
Foliar spray	Black	Black	Black	Black	Black	Black	Black	Black	Black	Black	Black	Black
Basal bark	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded
Cut stump	Black	Black	Black	Black	Black	Black	Black	Black	Black	Black	Black	Black
Physical control	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded

#### Key

- Striped cells (≡) Approximate times for growth/reproductive events
- Black/dark grey cells (■) Months most suitable for control option specified
- White cells (□) Months that are unsuitable for control option specified
- Shaded cells (▨) Months that are less suitable for control option specified

It should be noted that peak growth, flowering and seeding times of chinee apple trees can vary according to seasonal conditions; these will also influence the optimum timing of control.

Timing of control and monitoring may need to be varied according to conditions and situations. Wet conditions (artificial or natural) can facilitate germination at any time of year. Following ingestion by animal, faeces can also provide an environment that promotes germination.

Optimal conditions for chinee apple establishment are high summer rainfall (good wet season) followed by a mild, short winter (dry season).

All treated areas should be revisited to gauge management success. Mechanical or chemical follow-up treatments should be undertaken as soon as possible.



## 6.2 Chemical control

### 6.2.1 Disclaimers

In the Northern Territory, a registered product **must** only be used in situations consistent with those appearing on the label, **unless** authorised under a permit; and a person:

- must not have in their possession **or** use a chemical product unless the product is registered in Australia (exemptions apply);
- may use a registered product at a concentration, rate or frequency lower than that specified on the label **unless** this is specifically prohibited on the label. This does not apply to herbicide use occurring under an APVMA permit;
- may use a registered product to control a pest not specified on the label provided the pest is in a situation that is on the label **and** use on that pest is not specifically prohibited on the label; and
- may also use a registered product using a method not specified on the label **unless** this is specifically prohibited on the label.

Users of agricultural (or veterinary) chemical products must always read the label and any permit, before using the product and strictly comply with the directions on the label and any conditions of permit. Users are not absolved from compliance with label directions or conditions of permit by reason of any statement made in or omission from this publication.

### 6.2.2 Registered herbicides for use on chinee apple

**Table 3: Herbicide management options for chinee apple infestations**

Chemical and concentration	Rate	Situation and method
<b>Triclopyr 300 g/L &amp; Picloram 100 g/L</b> Various trade names	350ml / 100 L	<b>Seedlings (individuals or infestation - up to 2 m)</b> Foliar spray, apply when actively growing + wetting agent
<b>Triclopyr 600 g/L</b> Various trade names	1 L / 60 L (diesel) 1 L / 60 L (diesel)	<b>Seedling (individuals)</b> Basal bark < 5 cm* stem diameter <b>Adult (individuals or infestation)</b> Cut stump > 5 cm stem diameter
<b>Fluroxypyr 200 g/L</b> Various trade names	3 L / 100 L (diesel) 3 L / 100 L (diesel)	<b>Seedling (individuals)</b> Basal bark < 15 cm* stem diameter, treat up to 45 cm from the ground <b>Adult (individuals or infestation)</b> Cut stump > 15 cm stem diameter
<b>Fluroxypyr 333 g/L</b> Various trade names	1.8 L / 100 L (diesel) 1.8 L / 100 L (diesel)	<b>Adult (individuals)</b> Basal bark < 15 cm* stem diameter, treat up to 45 cm from the ground <b>Adult (individuals or infestation)</b> Cut stump < 15 cm stem diameter
<b>Triclopyr 240 g/L &amp; Picloram 120 g/L</b> Access®	1 L / 60 L (diesel) 1 L / 60 L (diesel)	<b>Seedling (individuals)</b> Basal bark < 15 cm* stem diameter <b>Adult (individuals or infestation)</b> Cut stump > 15 cm stem diameter

\*It is noted that basal barking can be effective on trees of larger diameter. Basal barking, being less labour intensive than cut stumping, may be a preferable option for sparse or remote infestations. Cut stump applications may be the best management option for trees in urban/landscaped situations where the dead tree material will be removed to retain aesthetics.

### 6.2.3 When to apply herbicide

Treating chinee apple prior to the production of fruit is always considered optimal.

**Foliar spray** can be applied at any time that seedlings are actively growing.

**Basal bark** treatments can be undertaken at any time of year, but are best administered during the active growing season. This will be approximately March to May depending on the onset of rain and location.

**Cut stump** treatments can be undertaken at any time of year, but are best administered during the active growing season.

### 6.2.4 How to apply herbicide

**Foliar spraying** should be on seedlings only (up to 2 m tall). A fine spray with low application pressure enables good coverage of the whole plant. Plants should be sprayed comprehensively and to the point of saturation (more herbicide is required per plant for foliar spraying than for other herbicide application methods).

**Basal bark treatment** involves spraying around the whole stem up to 45 cm from the ground. The stem should be wet to the point of run-off. Larger trees can be treated using this method, however the stem should be sprayed to 1 m above ground. To ensure a comprehensive application, debris should be removed from around the base of the chinee apple plant and all crevices and branches within the specified height range should be treated.

**Cut stump treatment** involves applying herbicide to a newly cut stump immediately following chainsawing. This labour intensive method is best suited to low density infestations or isolated plants. The cut should be horizontal and as close as possible to the ground. The newly cut surface should then be sprayed or swabbed with herbicide within 15 seconds. This method can become more difficult when the chinee apple plant has multiple stems.

## 6.3 Non-chemical control

### 6.3.1 Physical removal

Chinee apple trees can be initially cleared by stick raking or bull dozing. However, chinee apple recovers rapidly following this type of disturbance, so remaining broken/exposed stems should be treated by basal bark spraying as soon as possible following clearing.

**Stick raking** is effective for medium to high density infestations. A stick rake is an implement designed to attach to dozer tines so that it can be used to cut the stems below ground level. Given the low levels of chinee apple infestations in the Northern Territory, this method of control is generally considered inefficient and cost prohibitive.

**Blade ploughing** involves pushing or pulling a blade-plough attachment through plants to cut stems off below ground level. This control method is suitable for low to medium density infestations. It is best undertaken before seed set or when root reserves are low.

**Dozer pushing/grubbing** is suited to medium and high densities of chinee apple; but it is still effective for low and scattered densities. This method is similar to blade ploughing in that it aims to use a blade to push over individual trees at or below ground level.

## *Regrowth*

Given chinee apple's resilience to physical disturbance and its capacity to rapidly regenerate, follow up spraying of regrowth is essential.

## *Germination*

The removal of plant material and disturbance of soil which results from physical removal of chinee apple can create ideal conditions for seed germination. Planting of improved pasture or promotion of native plant regeneration will help to prevent the further establishment of chinee apple seedlings.

Monitoring and follow up control of seedlings is an important part of an on-going management program.

### 6.3.2 Pastoral land management

Cattle are known to assist chinee apple spread. Cattle feed on the palatable fruit, with seeds remaining viable once passed through the intestinal tract. Cattle should be excluded from areas containing fruiting plants to minimise seed spread. Cattle should also be excluded from infestation areas prior to undertaking control.

Newly transported stock should be isolated and monitored for at least six days, particularly those coming from Queensland or properties with known chinee apple infestations. Similarly cattle which have been allowed to graze in areas with available fruit must be isolated prior to relocation to clean paddocks. Any newly germinating chinee apple observed in holding paddocks should be destroyed immediately.

Grazing should be minimised after control efforts to encourage grass growth. Competition from pasture species can reduce chinee apple germination and seedling growth.

Utilise and equip on-ground staff such as bore runners who frequent the property, to implement early detection and eradication programs, particularly around bore infrastructure where stock and ferals congregate.

### 6.3.3 Biological control

Biological control involves the introduction of insects or pathogens to control exotic plant species. There are no biological control options currently being investigated for chinee apple in the Northern Territory. The sparse and low density infestations of chinee apple which are found in the Northern Territory require immediate and more aggressive control methods to ensure eradication. Further, these infestation levels are not capable of sustaining viable biological control agent populations.

### 6.3.4 Fire management

Fire is **not** a recommended management option for chinee apple. Fire has been found to promote chinee apple growth, while negatively impacting competing native plant species. In the event of fire, extensive regrowth will need to be chemically treated.

### 6.3.5 Monitoring results and follow up

Chinee apple seeds may remain viable in soil for several years, however most seeds germinate or are destroyed within the first year. Known management/control sites will need to be revisited to ensure all seedling recruitment is identified and treated at an early stage. It is also important to ensure that no existing plants have survived previous treatments. It is recommended that treatment sites are revisited within three months of the initial treatment.

### 6.3.6 Further information

Further information can be found in the *Northern Territory Weed Management Handbook*.

## **7. Developing a weed spread prevention program**

Spread prevention is the most successful and cost effective way of managing weeds. Chinesee apple seeds are readily spread by animals and people who eat the fruit. Germination actually increases if the endocarp (fruit flesh) is removed or eaten. Chinesee apple seeds can remain viable in soil for at least a year.

### **7.1 Stock management**

Cattle are a major cause of chinesee apple spread. Chinesee apple fruit are highly palatable to cattle and other livestock. Seeds remain viable after being passed through the gut. Animal movement can allow chinesee apple germination far from a parent tree.

Minimise spread by:

- a) isolating newly transported stock, particularly those coming from Queensland or other properties with known chinesee apple infestations, and monitoring the holding paddocks for emergence of chinesee apple seedlings;
- b) isolating stock moving from infested to clean paddocks and monitoring clean areas for emergence of chinesee apple seedlings; and
- c) preventing grazing in areas where chinesee apple fruit is available, potentially by using fencing to contain infestations. This is important prior to trucking cattle, as many remote road infestations can be attributed to cattle truck movements.

### **7.2 Hygiene procedures**

Chinesee apple seeds are about 8 mm long, brown, smooth and shiny. Vehicles and machinery, including those used in chinesee apple control, may be a source of chinesee apple spread, particularly in muddy conditions. The following actions are recommended for inclusion into prevention programs to reduce chinesee apple spread:

- a) map and monitor isolated infestations;
- b) always work from clean areas back toward infested areas;
- c) schedule control works to occur prior to seed set;
- d) designate wash down areas (see below);
- e) ensure contractors and machinery operators are familiar with hygiene protocols and weed identification; and
- f) ensure machinery entering and leaving your property is clean.

### **7.3 Wash down facilities**

Wash-down facilities should be established on all affected properties. These facilities may incorporate high pressure wash-down, compressed air blast, vacuuming and/or physical removal (e.g. hand brush).

Wash down facilities:

- a) must be located in an area(s) which will minimise the risk of spread (on or off site);
- b) must be regularly checked for weed seedlings which may have germinated from seeds washed off vehicles etc. Any weeds should be controlled immediately; and
- c) should be sited in cleared/developed areas to minimise the risk of undetected weed establishment and spread.

Where it is impractical to establish a wash-down facility, consideration is to be given to adopting alternative options and solutions to manage seed transfer.

## 7.4 Integrated natural resource management

Weed management should always be closely linked to broader natural resource management at the property and catchment levels. Weed spread and germination can be enhanced in degraded areas, such as those impacted by erosion, wild fire, overgrazing and feral animals. Feral pigs in particular, are known to harbour in denser infestations of chinee apple. They can also act as vectors for seed spread, as seeds can remain viable post-ingestion.

## 8. Tracking progress and judging success

A property weed management plan should include realistic time frames and goals, recognising that achievements, particularly with regards to established weed populations, may only become evident in the long term. It is important to document weed occurrences and the control methods used so that success, or failure, can be critically analysed. Accurate records can enable a management program to be reworked or fine tuned depending on the need (refer Appendix A).

### 8.1 Local level

#### 8.1.1 Follow up control

Follow up inspection, and if necessary, re-treatment is a vital part of long term weed management planning. Treatment areas must always be revisited to ensure that treated plants are dead. Areas must be checked for at least ten years after eradication is thought to have been achieved, to account for any viable seeds which may remain in the soil seed bank.

#### 8.1.2 Maintaining records

It is important to keep track of what is happening in 'the bigger picture' i.e. is the weed control being undertaken contributing to the objectives of this Plan? To accurately determine if, and what, progress is being made, records must be maintained that show weed control activities (outputs) and the results of the activities (outcomes).

Records of herbicide purchases and contractor expenses etc should also be maintained for future assessment. Improvements relating to efficiency and expenditure are dependent on knowing exactly what is happening. Management records should be submitted to the Weed Management Branch annually. An example of an appropriate format is at Appendix A.

#### 8.1.3 The supply of chinee apple distribution data

The supply of weed data to the Weed Management Branch by individuals and groups is fundamental to planning, prioritising and coordinating strategic weed management. The positive identification of chinee apple in an unexpected area should be reported directly to the Weed Management Branch, as immediate action may be deemed necessary.

A more detailed description of where chinee apple is located on your property can be submitted in accordance with the [Northern Territory Weed Data Collection Manual](#) and [Field Guide for Collecting Weed Data in the NT](#). These technical guidelines describe what information to collect when mapping, controlling and monitoring weed infestations in the Northern Territory. The supply of weed data to the Weed Management Branch, in accordance with these guidelines, will contribute to the collection of accurate data fundamental to planning and delivering strategic and coordinated weed management across the Northern Territory.

### 8.2 Territory level

All Weed Management Plans endorsed under the Act must be reviewed every three years.

#### 8.2.1 How will we know if this Weed Management Plan is working?

Full compliance with a Weed Management Plan can require a great deal of effort, commitment and investment from land managers, particularly from those who are already affected by declared weeds. For this reason it is essential that the Territory Government

monitors whether the stipulated management actions are contributing towards the identified outcomes at a Territory level.

### 8.2.2 Adaptive management

Each Weed Management Plan has been developed using the best information available at the time of writing. However, new information may become available which should be included in, or influence the structure and content of this Plan. Allowing for this flexibility enables an adaptive management approach.

The Territory Government is committed to applying an adaptive management approach to weed management across the Territory. Specifically it will use data and feedback gathered from land managers and other stakeholders to refine and improve future management decisions and ultimately, the weed management plans.

Continuous improvement can only be achieved if the following can be determined:

- if investments in weed management are resulting in progress towards the identified objectives; and
- if the management requirements are achieving the required outcomes.

### 8.2.3 Government commitments and accountability

Government is committed to increasing land manager capacity to identify and control chinee apple, raising awareness of the risks chinee apple poses, supporting and encouraging collection and submission of chinee apple mapping data and utilising this data to develop strategic and targeted control programs. It will also work with industry and local growers to actively discourage production, sale and purchase of chinee apple across the Northern Territory.

The Weed Management Branch will work with other Divisions from DLRM and Government landholders to design and implement a monitoring program that allows this Management Plan, the management actions contained within it, and the outcomes produced to be evaluated. The monitoring program should have sufficient resolution to allow management outcomes at a local, through to regional management scale, to be evaluated. The Minister will consider advice from the public, community and industry stakeholder groups and the Northern Territory Weed Advisory Committee prior to approving, or making changes to, any statutory Weed Management Plan.

## 8.3 Communication


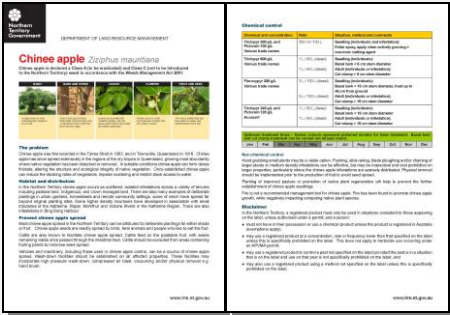

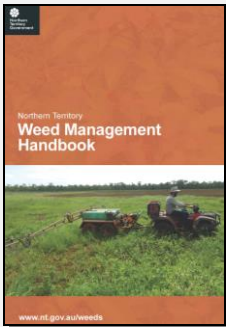
Effective and cooperative chinee apple management can only be achieved if all stakeholders understand the risks posed by chinee apple and the control methods needed to strategically manage these risks. The Weed Management Branch of DLRM, has developed a comprehensive range of extension material which aims to help land managers identify, prioritise and control declared weeds in a manner which is consistent with best management practice and legislation.

It is recognised that effective communication is always a two way process. The Territory Government is dependent on receiving feedback from people who are involved in on-ground chinee apple management so that this Weed Management Plan can be continually assessed, and subsequently improved.

# 9. Support and information for land managers

The Weed Management Branch (DLRM) can provide training, advice and extension materials related to support improved chinee apple management.

The following documents are available by contacting your local Weed Management Branch.

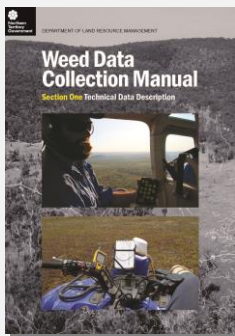
 <p><b>Chinese apple (<i>Ziziphus mauritiana</i>)</b> Chinese apple is listed as Class A in the Australian Weed Register and Class C in the Weed Register of the NT.</p> <p><b>Identify</b> <b>Stems and stems</b> <b>Leaves</b> <b>Flowers</b> <b>Fruit and seeds</b></p> <p><b>Large seed or oval</b> <b>Small</b> <b>Dark green to black</b> <b>Dark green to black</b> <b>Dark green to black</b></p> <p>Weed Management Officers from the Weed Management Branch (Department of Land Resources Management) can provide advice on all aspects of weed management including control methods, biological control, legislative responsibilities, policy advice, training and monitoring and reporting strategies. For further information on weed management planning, strategies, control methods, biological control, monitoring and reporting please refer to the NT Weed Management Branch.</p> <p>Ph: 08 8999 4827   Email: weeds@nt.gov.au   Information: www.dlrm.gov.au</p>	<p><b>Chinese Apple Weed Identification Table</b></p>	<p>Contains photos and written descriptions to assist with identification. Available in English and Vietnamese</p>																								
 <p><b>Chinese apple (<i>Ziziphus mauritiana</i>)</b></p> <p><b>The problem</b></p> <p><b>Impact and distribution</b></p> <p><b>Management options</b></p> <p><b>Chemical control</b></p> <table border="1"> <thead> <tr> <th>Chemical Control</th> <th>Application</th> <th>Application</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td>2,4-D</td> <td>1000-1500 g/ha</td> <td>1000-1500 g/ha</td> <td>Use 2,4-D if the weed is not flowering.</td> </tr> <tr> <td>2,4-D</td> <td>1000-1500 g/ha</td> <td>1000-1500 g/ha</td> <td>Use 2,4-D if the weed is not flowering.</td> </tr> <tr> <td>2,4-D</td> <td>1000-1500 g/ha</td> <td>1000-1500 g/ha</td> <td>Use 2,4-D if the weed is not flowering.</td> </tr> <tr> <td>2,4-D</td> <td>1000-1500 g/ha</td> <td>1000-1500 g/ha</td> <td>Use 2,4-D if the weed is not flowering.</td> </tr> <tr> <td>2,4-D</td> <td>1000-1500 g/ha</td> <td>1000-1500 g/ha</td> <td>Use 2,4-D if the weed is not flowering.</td> </tr> </tbody> </table> <p>DLRM - Department of Land Resources Management</p>	Chemical Control	Application	Application	Notes	2,4-D	1000-1500 g/ha	1000-1500 g/ha	Use 2,4-D if the weed is not flowering.	2,4-D	1000-1500 g/ha	1000-1500 g/ha	Use 2,4-D if the weed is not flowering.	2,4-D	1000-1500 g/ha	1000-1500 g/ha	Use 2,4-D if the weed is not flowering.	2,4-D	1000-1500 g/ha	1000-1500 g/ha	Use 2,4-D if the weed is not flowering.	2,4-D	1000-1500 g/ha	1000-1500 g/ha	Use 2,4-D if the weed is not flowering.	<p><b>Chinese Apple Weed Note</b></p>	<p>Provides information on the chinee apple identification, impacts, habitat, distribution and management.</p>
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 <p><b>Chinese apple (<i>Ziziphus mauritiana</i>)</b></p> <p><b>Management Plan for Chinese Apple (<i>Ziziphus mauritiana</i>)</b></p> <p><b>Objectives</b></p> <p><b>Control Methods</b></p> <p><b>Chemical Control</b></p> <p><b>Biological Control</b></p> <p><b>Physical Control</b></p> <p><b>Herbicide Resistance</b></p> <p><b>Monitoring and Reporting</b></p> <p><b>References</b></p> <p><b>Contact</b></p> <p><b>DLRM - Department of Land Resources Management</b></p>	<p><b>Chinese Apple Management Guide</b></p>	<p>Provides detailed information on chinee apple management.</p>																								
 <p><b>Northern Territory Weed Management Handbook</b></p> <p>www.nt.gov.au/weeds</p>	<p><b>Northern Territory Weed Management Handbook</b></p>	<p>Provides information on approaches to weed management, including integrated weed control methods. Specific information is provided on herbicides registered for use in the Northern Territory. The 'Weed control option tables' include a colour photo of the weed in question, list which herbicides are registered for use, indicate optimum treatment times and which method/s can be employed for maximum effectiveness.</p>																								





### Weed Spread Prevention Information

Provides information on roles and responsibilities regarding weed spread prevention in the NT.



### Weed Data Collection Manual

Provides information on when, what and how to collect weed mapping data in the NT.



### Field Guide for mapping weeds in the Northern Territory

This is a step-by-step guide to collecting weed mapping data using a GPS, how to submit data and how to use this data for weed management on your property.



### Weed ID Deck

Weed identification flipbook. Contains photos and written descriptions to assist with identification. Great for the glovebox.

## Appendix A: Chinese apple monitoring report template

- Your monitoring report should follow the format provided below.
- Digital versions of the form are available by e-mailing [weedinfo@nt.gov.au](mailto:weedinfo@nt.gov.au)
- Please contact your nearest Weed Management Branch if you need assistance.

Property owner/manager	
Mailing address	
Email address	
Phone	
Mobile	
NT Portion/Lot number	
Region/Hundred	
Period of report	

EXAMPLE ONLY

Management Requirements	Management Actions	Chinese apple location (scale map or GPS points to be provided)	Action taken (outputs) (include date and control technique)	Result of action (include observation notes)	Are any management changes necessary?	Outcomes
Eradication of isolated plants and outbreaks.	Design and implement an annual control program for chinese apple. A property management plan, including a weed management map should be developed.	<b>Brumby paddock</b> Scattered plants establishing in upland areas.	<b>14 January 2016</b> Sprayed areas of developing seedlings.  <b>14 February 2015</b> Isolated plants controlled using basal bark technique.	Poor results.  90% kill of existing plants. Multiple seedlings establishing.	Seedlings may have been too large. Change to basal bark method. No, but follow up is a necessity.	<b>20 March 2017</b> Approximately 90% kill of all seedlings using the basal bark method.
Seed spread prevention.	The design and implementation of a weed spread prevention program.	<b>Whole of property</b>	<b>11 September 2015</b> Installation of wash down bays and procedures. Weed ID manuals placed in shed / vehicles.	No spread detected outside initial infestation	No	<b>20 January 2017</b> No new chinese apple infestations were identified in clean areas.

## Appendix B: Targets – NTG Weed Management Branch

Who	Management requirements	Outcomes (positive changes)	Outputs (actions)	Completion Timeframe		
				Year 1	Year 2	Year 3
NTG Weed Management Branch	<p>Increase land manager capacity to identify chinee apple</p> <p>Increase awareness of risks posed by chinee apple</p> <p>Increase capacity of land managers to control chinee apple</p> <p>Support and encourage land managers to collect and submit chinee apple data in accordance with the NT Weed Data Collection Manual</p> <p>Collate, analyse and disseminate chinee apple data relevant to management priorities</p> <p>Develop strategic and targeted control and monitoring programs with relevant stakeholders</p> <p>Report on chinee apple management programs, successes and failures</p> <p>Evaluate control programs in collaboration with stakeholders</p>	Increased community awareness of the presence and impacts of chinee apple means that land managers are actively prioritising control	Communications strategy is developed with Communication and Media, DLRM	▲		
		The application of best practice management to chinee apple infestations is contributing to the control of chinee apple growth and spread	Targeted awareness, education and extension programs developed and implemented	▲	▲	▲
		Mapping data is being collected and utilised to inform investment in targeted chinee apple control and is used to determine control outcomes across the NT	More land managers are collecting and submitting valid chinee apple data to the Weed Management Branch	▲	▲	▲
		Mapping products are developed to inform property and tenure level approaches to chinee apple management	Mapping products are developed to inform property and tenure level approaches to chinee apple management	▲	▲	▲
		Collaborative control works are reducing chinee apple growth and spread	Collaborative, multi-tenure stakeholder programs for the NT are developed		▲	
		Chinese apple is eradicated from priority landscapes	Priority landscapes affected by chinee apple (as per regional WMPs and in consultation with stakeholders) are identified			▲
		Land manager capacity to identify and control chinee apple has increased dramatically	Field days and information sessions are held with various stakeholders across all spectrums and tenures. Minimum two per year	▲	▲	▲
		Government investment in weed control is strategic, effective and complementary to investment by adjoining land managers	WMB reviews all NTG tenders containing weed control components	▲	▲	▲
		Adaptive management has increased chinee apple eradication targets	Monitoring and review programs across multiple tenures are developed and implemented		▲	▲
		The Plan is achieving its objectives	Annual reporting and review of chinee apple management has occurred	▲	▲	▲

## Targets – Urban plantings

Who	Management requirements	Outcomes (positive changes)	Outputs (actions)	Completion Timeframe		
				Year 1	Year 2	Year 3
<b>Urban plantings (streetscapes, parks and suburban yards)</b>  Stakeholders can include: City Councils Community Councils Regional Councils Suburban residents NTG Departments Power Water Corp	Inspect the property/area for any chinee apple plants or infestations	Urban landholders are aware of legislative responsibilities and are actively managing chinee apple to meet their compliance obligations	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	▲	▲	▲
	Record the location of chinee apple plants or infestations	List of chinee apple locations informs a systematic removal program	Councils and land holders have contributed to a list of historic plantings	▲	▲	▲
	Notify the Weed Management Branch if you find chinee apple	Control efforts are being documented and recognised	The Weed Management Branch has been provided with weed distribution information	▲	▲	▲
	Advise the Weed Management Branch of any eradication works undertaken	There is a reduced perception of the value of chinee apple in the community	Awareness campaign developed and implemented describing the risks chinee apple poses to the NT		▲	▲
	Record the results of chinee apple control to evaluate success	Government departments, such as DoT and DoH, and councils etc are prioritising eradication of chinee apple from their land	Eradication programs developed and implemented across land ownership parcels		▲	▲
	Regularly monitor/survey land for new infestations or regrowth	Chinee apple trees have been replaced with more appropriate species	Lists of appropriate trees to replace chinee apple have been created	▲		
	Utilise a qualified arborist to remove large trees		Opportunities for tree replacement programs are investigated and supported			▲
	Understand risks posed outside of urban settings					

## Targets – Multi-tenure and core infestations

Who	Management requirements	Outcomes (positive changes)	Outputs (actions)	Completion Timeframe		
				Year 1	Year 2	Year 3
<b>Multi-tenure and core infestation areas</b>  Stakeholders can include: Dept of Transport Dept. of Housing KTC Dept of Lands, Planning and the Environment Rail corridor owners and managers Private landholders Traditional land owners Power Water Corp Parks and Wildlife NT	Inspect your property and adjoining areas for any chinee apple plants or infestations  Record the location of chinee apple plants or infestations  Notify the Weed Management Branch if you find chinee apple  Determine reasonable requirements for contribution to a strategic cross tenure eradication program  Document and implement the strategic eradication program on your property  Regularly monitor/survey land for new infestations or regrowth. Do this at least annually prior to flowering  Record the results of chinee apple control to evaluate success  Design, document and implement a weed spread prevention program	Stakeholders are able to identify chinee apple, and apply best practice management and spread prevention methods	Stakeholders 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 aware of legislative responsibilities and are actively managing chinee apple to meet their compliance obligations				
		Stakeholders are recording chinee apple locations as a tool for broad scale strategic control	The Weed Management Branch has been provided with weed distribution information	▲	▲	▲
		Chinee apple has ceased spreading	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	▲	▲	▲
		Collaborative and strategic chinee apple management is occurring at catchment level – administered by multiple stakeholders	Stakeholders contribute to district or catchment programs to contain and reduce large infestations, prevent spread between properties and prevent expansion into clean areas		▲	▲
		Adaptive approaches to chinee apple management are implemented through increased capacity and training, leading to more strategic, cost effective and efficient management and collaborative eradication programs	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	▲	▲	▲

## Targets – Indigenous communities

Who	Management requirements	Outcomes (positive changes)	Outputs (actions)	Completion Timeframe		
				Year 1	Year 2	Year 3
Indigenous communities	<p>Know how to identify and control chinee apple and know your legal obligations regarding chinee apple</p> <p>Inspect your community for any chinee apple plants or infestations and of your intended management</p> <p>Record the location of chinee apple plants</p> <p>Notify the Weed Management Branch if you find chinee apple</p> <p>For deliberate plantings and small infestations, eradicate all plants and replace with more appropriate bush foods</p> <p>For larger and spreading infestations, seek assistance and guidance from the Weed Management Branch on how to prioritise and control these infestations</p> <p>Advise the Weed Management Branch of any eradication works undertaken</p> <p>Regularly monitor/survey land for new infestations or regrowth</p> <p>Implement a weed spread prevention program</p>	Indigenous land managers are able to identify chinee apple, and apply best practice management and spread prevention methods.	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 aware of legislative responsibilities and are actively managing chinee apple to meet their compliance obligations				
		Indigenous land managers are aware of and are recording chinee apple locations	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		▲	▲
		Indigenous land managers contribute to district or catchment programs to eradicate and replace infestations with more appropriate species, prevent spread from community plantings and prevent expansion into clean areas	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 eradication programs are implemented and documented	▲	▲	▲
			Training and information days are held on country	▲	▲	▲
		Adaptive approaches to chinee apple management are implemented through increased capacity and training	Record the results of chinee apple control to evaluate success of the control		▲	▲
			Meet, discuss, share information and plan with neighbours and at community events		▲	▲
		There is a reduced perception of the value of chinee apple	Education and awareness campaigns of the risk chinee apple poses to the Northern Territory are developed and implemented – aim also at younger generations	▲	▲	▲
		Communities maintain healthy eating via alternate bush tucker plantings	A tree replacement program utilising the Jawoyn Bush Tucker Guide (2012) has been developed and implemented		▲	▲



## Targets – Market gardeners and farmers

Who	Management requirements	Outcomes (positive changes)	Outputs (actions)	Completion Timeframe		
				Year 1	Year 2	Year 3
Market gardeners and farmers	<p>Know your legal obligations to eradicate chinee apple</p> <p>Inspect your property for any chinee apple plants or infestations</p> <p>Record the location of chinee apple plants and notify the Weed Management Branch if you find chinee apple</p> <p>For commercial or buffer plantings, design, document and implement an eradication and replacement crop program to minimise production losses</p> <p>For wild harvest or unmanaged infestations, design, document and implement an eradication program</p> <p>Advise the Weed Management Branch of any eradication works undertaken</p> <p>Regularly monitor and survey land for regenerating trees or regrowth</p> <p>Design, document and implement a weed spread prevention program</p> <p>Do not sell chinee apple plants, seeds or fruit under any circumstances</p>	Landholders are aware of legislative responsibilities and are actively managing chinee apple to meet their compliance obligations	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.	▲	▲	▲
		Landholders are recording chinee apple locations to inform strategic property planning	Landholders are actively undertaking annual inspection, survey and mapping of chinee apple on their properties	▲	▲	▲
		Alternate crops and windbreaks have replaced chinee apple plants in rural areas	Eradication and replacement programs have been implemented on property		▲	▲
		Landholders contribute to district or catchment programs to contain and reduce infestations, prevent spread between properties and prevent expansion into clean areas	The Weed Management Branch has been provided with weed distribution information to assist with strategic planning for eradication works	▲	▲	▲
			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	▲		
		Sales of chinee apple plants and fruit have ceased	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	▲		▲



## Targets – Transport and Service Corridors

Who	Management requirements	Outcomes (positive changes)	Outputs (actions)	Completion Timeframe		
				Year 1	Year 2	Year 3
<b>Transport and service corridor owners, managers and developers</b> Stakeholders can include: DoT DoI Power Water Corp Rail corridor owners and managers Gas pipeline owners and managers Corridor maintenance contractors Corridor construction contractors LGANT City Councils Community Councils Regional Councils NBN	Inspect corridors for any chinee apple plants or infestations Record the location of chinee apple plants or infestations Notify the Weed Management Branch if you find chinee apple Design, document and implement an eradication program Advise the Weed Management Branch of any eradication works undertaken Record the results of chinee apple control to evaluate success. Regularly monitor/survey land for new infestations or regrowth Design, document and implement a weed spread prevention program	Stakeholders are able to identify chinee apple, and apply best practice management and spread prevention methods.	Stakeholders 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 aware of legislative responsibilities and are actively managing chinee apple to meet their compliance obligations		▲	▲	▲
		Stakeholders are recording chinee apple locations to inform eradication programs	Stakeholders are actively undertaking annual inspection, survey and mapping of chinee apple	▲	▲	▲
		Stakeholders contribute to district or catchment programs to contain and reduce infestations, prevent spread and prevent expansion into clean areas or areas under active control	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			▲
		Corridor managers are working collaboratively with neighbouring properties to reduce spread along and from corridors and prevent reintroduction of chinee apple into each others' tenures	The Weed Management Branch has been provided with weed data to assist with strategic planning	▲	▲	▲
		Strategic planning is in place to allocate time, effort and resources efficiently and effectively	Stakeholders are actively engaging in cross property border chinee apple eradication programs	▲	▲	▲
		Chinee apple is eradicated from corridors immediately upon detection	A strategic eradication program is implemented		▲	
		Corridors are under active monitoring programs	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			▲

#### WEED MANAGEMENT BRANCH CONTACTS

For more information or advice in relation the identification, management or monitoring of weeds please contact the Weed Management Branch:

Phone: (08) 8999 4567

Email: [weedinfo@nt.gov.au](mailto:weedinfo@nt.gov.au)

Website: <http://www.lrm.nt.gov.au/weeds>

The NT Herbarium can also provide plant identification advice

Phone: (08) 8999 4516