

A MANAGEMENT PROGRAM  
FOR  
THE COMMERCIAL HARVESTING OF  
TIMBER FROM NATIVE  
VEGETATION  
IN THE NORTHERN TERRITORY OF AUSTRALIA



**(DRAFT)**

2004-2009



**PARKS AND WILDLIFE SERVICE**

**DEPARTMENT OF INFRASTRUCTURE, PLANNING AND ENVIRONMENT**

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## EXECUTIVE SUMMARY

This management plan covers the commercial taking of tree species for use as timber or woodchips. The Northern Territory has a range of vegetation types dominated by trees. Some of these are very patchy in their occurrence (e.g. monsoon forest), or occur in sensitive environments (mangrove forests). There are extensive areas of savannas that superficially appear to contain extensive timber resources. However, defect levels in trees in this environment are high, due mainly to termite attack. As a result the use of the resource for timber occurs at a small scale. However, the historical use of timber in some areas has been unsustainable. Unfortunately, our knowledge of resource levels, growth rates and the impacts of logging on natural values is limited. This management plan sets out measures that endeavour to ensure future use of the resource will be undertaken in an ecologically sustainable manner.

### Objectives

The objectives of the management plan are to:

1. maintain viable wild populations throughout their range of all tree species subject to timber harvesting;
2. ensure no long term serious detrimental effects on water, soil, geomorphology, flora or fauna result from harvesting;
3. regulate and monitor the sustainable utilisation of harvesting of timber species throughout the Northern Territory; and
4. provide incentives and mechanisms for conservation benefits to accrue from the sustainable harvesting of trees on freehold and leasehold land.

### Management measures

- Permits are required for commercial harvesting.
- Except in cases where a permit to clear native vegetation has been issued, only selective harvesting will be allowed.
- Consideration of heritage, archaeological, and natural values will be required in the formulation of logging plans.
- Fire management practices suitable for ensuring regeneration after harvesting will need to be described and implemented after harvesting.
- Details of how the site will be accessed will be required.
- Consideration of weed issues will be required.
- Royalties are payable for tree species harvested from leasehold or Crown land.
- Returns are required detailing numbers of stems taken, the precise locations (using GPS) from where they were harvested (for non-salvage operations) and utilisation of the logs.
- Reharvesting in an area will not normally be allowed until a period of 20 years has elapsed.
- The minimum size of tree normally allowed to be harvested will be 25 cm diameter at breast height over bark for species in the genera *Eucalyptus*, *Corymbia* and *Erythrophleum* and 20 cm for species from other genera.
- Habitat trees (trees with hollows) will not be allowed to be taken unless five such trees remain per hectare.

- Logging will be excluded from certain areas (e.g. road reserves, riparian reserves, highly erodible soils, steep slopes).
- Logging in vegetation communities from sensitive environments or of conservation significance would normally not be permitted.
- Tree species that are classified as Near Threatened or are of high conservation significance will only have a permit issued for harvesting if there is a management agreement between the landholder and the Parks and Wildlife Service.
- Increased duration of permits and waiving of royalties will be used as an inducement for landholders that carry out logging to enter into conservation management arrangements.

Some of the above requirements may be waived in the case of:

- harvesting in an area where permission has been granted to clear the native vegetation (i.e. salvage logging);
- small scale harvesting.

### **Monitoring**

10% of the areas covered by permits in a particular year will be monitored for compliance with permit conditions. Monitoring of fire management for successful regeneration post-logging could extend up to 5 years after logging. Auditing of sales information may also be undertaken. Rehabilitation works may be required if unacceptable environmental damage has occurred.

### **Reporting and review**

A review of the program will be undertaken within five years of approval of the plan. Reporting on timber harvesting and the associated monitoring will be undertaken as part of the review.

# 1. INTRODUCTION

## 1.1 Overview

The Northern Territory government's *Strategy for Conservation Through the Sustainable Use of Wildlife* seeks to foster the conservation of plants and animals and their habitats through allowing their sustainable use. The strategy includes the preparation of a management plan for native timber species as one of its actions. This plan sets out the methods to be used to:

- regulate the harvesting of timber so that it is undertaken in an ecologically sustainable manner; and
- encourage land managers to achieve conservation management outcomes as a component of their commercial operation, supported by the benefit gained from the use of native species.

Timber harvesting in the Northern Territory has a long history. However lack of management led to unsustainable harvests in the early decades after settlement. Information on the timber resources of the Northern Territory is generally poor. Quantitative inventory data are lacking, as is information on the quality of the resource. However, it is clear that resource levels are generally low (primarily due to degradation by termites) and scattered and hence it is unlikely that there will ever be large scale harvesting from native forests.

No indigenous species that is commonly used as timber is currently classified as threatened in the Northern Territory. However, there are some threatened species that are potentially able to be utilised as timber or wood products such as fence posts or woodchips. Some timber species such as *Callitris intratropica*, although widespread, are declining due to contemporary fire regimes and hence can be locally threatened.

## 1.2 Species Subject to Management

All indigenous tree species harvested for commercial purposes for timber or related products are subject to this management program.

## 1.3 Supervisory Authority

Parks and Wildlife Service  
Department of Infrastructure, Planning and Environment  
PO Box 496  
Palmerston, Northern Territory, Australia 0831

Telephone: (08) 8999 4401  
Facsimile: (08) 8999 4524

## 1.4 Legislation and National and International Obligations

*Northern Territory*

Tree species are not protected wildlife under the *Territory Parks and Wildlife Conservation Act 2000* unless they occur in a park, reserve, sanctuary, wilderness zone or

areas of essential habitat or are classified as threatened under that Act. However, a permit is required under section 55 of the Act if they are to be taken for commercial purposes. Section 116 of the Act provides for the collection of royalties on all timber harvested on lands owned by the Territory. This land includes all leasehold land, all crown land including road reserves, Parks and Reserves.

The *Pastoral Lands Act 1992*, *Control of Roads Act 2001* and *Crown Lands Act 2000* include provisions for the use of woody vegetation. The relevant agencies administering these Acts have delegated their requirement for a licence to the Parks and Wildlife Service, for the taking of plants or plant products for commercial purposes from pastoral, road reserves and Crown Lands.

The *Environmental Assessment Act 1994* provides a means for assessing the impact of specific proposed timber harvests that are deemed by the Parks and Wildlife Service of a scale or nature that could have significant impact on the environment and associated natural resources.

The *Heritage Conservation Act 2000* provides for the registration and protection of sites and objects of prehistoric, historic, social, aesthetic or scientific value. A Heritage Advisory Council is established under the act with the responsibility, among other things, of registering heritage places and advising on their conservation.

The *Northern Territory Aboriginal Sacred Sites Act 2000* provides for the protection and registration of sacred sites, and establishes a procedure for the avoidance of sacred sites in the development and use of land. The Aboriginal Areas Protection Authority is responsible under the Act for maintaining a register of sacred sites.

The *Soil Conservation and Land Utilisation Act 2001* provides for declaration of areas where there is a high likelihood of soil erosion associated with the use of the land.

The *Water Act 2001* provides for the protection and management of water resources. It is an offence under the Act to pollute groundwater or water in a waterway.

Under the *Planning Act 2003* clearing of native vegetation (including the timber) requires a development permit from the Department of Infrastructure, Planning and Environment or is subject to planning controls in areas such as the Litchfield Shire.

#### *Other States and Territories*

The Northern Territory, along with other States and Territories and the Commonwealth government, is a signatory to the National Forest Policy Statement (1992). The NFPS provides the framework within which the governments can achieve their vision for the sustainable management of Australia's forests and ensure the community obtains a balanced return from all forest uses. The NFPS adopts three principles as the basis for sustainable forest management:

- maintaining the ecological processes within forests (the formation of soil, energy flows, and the carbon, nutrient and water cycles);
- maintaining the biological diversity of forests; and
- optimising the full range of environmental, economic and social benefits to the community from all uses of forests within ecological constraints.

### *Commonwealth and International*

The Commonwealth's *Environmental Protection and Biodiversity Conservation (EPBC) Act 1999* can apply in relation to land development if nationally significant environmental values are likely to be impacted.

The Commonwealth's EPBC Act regulates the export of native flora but does not apply to timber. The import and export of timber is administered by the Australian Quarantine and Inspection Service under the *Quarantine Act 1908* and the *Export Control Act 1982*.

The International Tropical Timber Agreement (1983) aims to promote cooperation between member countries in relation to trade, marketing, utilisation, forest management, sustainable use and conservation of tropical forests. The Convention on International Trade in Endangered Species (CITES) regulates trade in species that are considered to be threatened.

Australia is part of an international effort, involving 12 countries that account for 45 percent of the world trade in wood and wood products, to develop and implement criteria and indicators to assess progress in the development of ecologically sustainable forest management. The criteria under the Montreal Process cover broad forest values that society seeks to maintain (i.e. conservation of biodiversity, ecosystem health, conservation of soil and water resources, maintenance of the forest contribution to global carbon cycles, socio-economic benefits and a legal, institutional and economic framework for forest conservation and sustainable management). Indicators for these criteria provide measures of change over time. The Northern Territory is a member of the Montreal Implementation Group that is implementing the use of these criteria and indicators for Australia (Montreal Implementation Group 1997).

The Australian Forestry Standard ([www.forestrystandard.org.au](http://www.forestrystandard.org.au)), produced in 2002, sets out economic, social, environmental and indigenous criteria for assessing whether a forest is well managed. Application of the standard is voluntary and was intended to assist with market access for certified timber.

## **2. AIMS AND OBJECTIVES**

This management program is directed at ensuring the long-term maintenance of tree species as a sustainable, renewable resource, and thus a source of income, for landowners and lessees. In line with the *Strategy for Conservation through the Sustainable Use of Wildlife in the Northern Territory* and the principles of management of wildlife under Section 31 of the *Territory Parks and Wildlife Conservation Act 2001*, this program also provides for conservation outcomes to be linked to the utilisation of these natural resources.

The objectives of the management plan are to:

1. maintain viable wild populations of all timber species throughout their range;
2. ensure that water, soil, geomorphology, flora and fauna are not adversely affected in

- the long-term by harvesting of trees;
3. regulate and monitor the sustainable harvesting of tree species throughout the Northern Territory; and
  4. provide incentives and mechanisms for conservation benefits to accrue from harvesting on freehold and leasehold land.

### **3. HARVESTING COVERED BY THIS PLAN**

#### **3.1 Timber harvesting covered by this plan**

The following type of harvest of indigenous timber species is covered by this management plan.

##### *Commercial harvest of timber*

A harvest is considered to be a commercial harvest where the timber is not retained for personal use and a benefit (usually financial) is obtained. Commercial harvest includes trading, bartering, gift and sale of wildlife. Commercial harvesting may occur in two different circumstances:

- timber taken for commercial purposes from an area where permission has been granted for clearing from a relevant authority (e.g. Pastoral Lands Board, Department of Infrastructure, Planning and Environment) for reasons other than timber harvesting e.g. clearing for infrastructure, agriculture, horticulture, timber plantation establishment or urban development. This is referred to as salvage harvesting.
- harvest of timber from an area where permission to clear has not been obtained. This includes harvesting of timber for commercial utilisation by Aboriginals on their traditional lands. It also includes the extraction of timber where it is used on the property it is taken from in cases where that use clearly goes beyond use for personal or pastoral-related activities. For example, harvest of timber for infrastructure for a tourism venture on the property where it was harvested from would be covered by this plan.

#### **3.2 Timber harvesting NOT covered by this plan**

The following types of harvest of indigenous timber species are **NOT** covered by this management plan.

##### *Customary harvest*

Use of timber species for food, ceremonial or religious purposes by Aboriginal groups from an area that they have traditionally used is permitted under Section 122 of the *Territory Parks and Wildlife Conservation Act 2001* in line with the Commonwealth *Native Title Act 1993*. A permit is not required for such harvesting.

##### *Non-commercial harvest*

Indigenous timber species taken from any tenure of land that are not to be sold, bartered, exchanged, displayed or propagated for commercial return or use related to an individual's livelihood, trade or profession are not covered by this plan. As most timber

species are not classified as protected wildlife no permit for non-commercial use is required. However, a permit is required if a species is classified as threatened, and hence protected, under the *Territory Wildlife Regulations*.

#### *Harvest associated with mining*

Under Section 180 of the *Mining Act 2002* the holder of a mining tenement or exploration retention licence may cut and remove timber if it is to be used for the purposes of mining or exploration.

#### *Harvest in parks and reserves*

Plants can be removed from a park or reserve at the discretion of the Director of Parks and Wildlife if such removal is consistent with an approved management plan or subject to a permit approved for scientific research. Commercial harvesting of timber in parks or reserves is prohibited unless part of a limited salvage operation (such as associated with road construction) specifically authorised by the Director. Such harvesting in parks and reserves is not covered by this plan.

#### *Harvest for use on a pastoral lease*

Use of timber by the holder of a pastoral lease in connection with the day-to-day management of the land for pastoral production is allowed under Section 38 of the *Pastoral Land Act 2001*. This activity does not require a permit and is not covered by this plan. However, clearing of areas on pastoral leases does require approval of the Pastoral Lands Board.

#### *Harvest for firewood*

A few permits are issued each year for the harvest of firewood in the southern half of the Northern Territory. This form of harvest of trees is not included under this plan. Firewood harvesting mainly involves collection of dead wood.

#### *Harvest for production of Indigenous art and craft*

There is a large number of artists, particularly in remote Aboriginal communities, that rely on small-scale harvesting to produce art and craft items that are of great economic importance to individuals and communities in remote areas. Items produced include bark paintings, sculpture, weaving and jewellery. Regulation of this take via the present management plan would be inappropriate. A much more appropriate type of monitoring for such harvest would be via a collaborative approach in conjunction with the Aboriginal Art Centres (Griffiths *et al.* 2003). However, any small scale harvest of craftwood that occurred as part of a larger harvest of timber would be covered under the permit for the larger harvest.

Use of timber species for didgeridoos is also not included in this plan. Although there is a substantial large-scale harvest of didgeridoos (Taylor and Baker 2002), this harvest involves small, usually hollow stems and requires different prescriptions to those set out in this plan.

## 4. MANAGEMENT MEASURES

### 4.1 Permits

Permits are required to harvest timber for commercial purposes under the provisions of this management plan in accordance with Division 6 of the *Territory Parks and Wildlife Conservation Act 2001*. In situations that do not involve salvage harvest, permits will normally only be issued to the owners or leaseholders of land. This requirement is designed to ensure that at least part of the benefits of the harvest will flow to the owner. An incentive is then present for them to conserve wildlife and their habitats and co-operate with authorities in pursuing conservation goals (see section 4.14). In cases of salvage harvest from areas where approval to clear has been granted, the Parks and Wildlife Service will consider a permit being issued to the harvester where the approval of the owner has been obtained. On Crown land a licence will be issued to a harvester. However, harvest from Crown land will only be approved where a conservation benefit or management benefit (e.g. fire management) would result from the logging.

A fee is likely to be introduced for the issue of a permit in the near future. This is expected to be \$40.

The following information is required to be provided in a permit application:

1. Name and address of landholder/leaseholder (including the appropriate Land Council, Land Trust or management organisation for Aboriginal land).
2. Proof of ownership or interest. Applicants will be required to provide a copy of their title deed or lease to prove they are the owners or leaseholders of the land where harvesting is requested to occur. In the case of Aboriginal Land Trusts applicants will need to provide a letter from the appropriate Land Council confirming that they have customary harvesting rights on the land before a permit will be issued.
3. Particulars of the title (lot, section, hundred and Northern Territory portion numbers), if the land can be defined in this way.
4. Area from which the timber will be harvested indicated on a map at a minimum scale of 1:100 000 but preferably at a scale of 1:50 000 or finer. It is important that this is undertaken accurately and not overestimated (see section 4.6). The map must include contour lines and grid references. All watercourses, seepage zones, permanent water bodies and exclusion zones are to be indicated (see section 4.9).
5. Name and address of all persons to undertake harvesting under the permit.
6. Registration numbers of vehicles to be involved in harvesting.
7. Species to be harvested, giving both the scientific name and common name.
8. Number of stems of each species to be harvested.
9. A declaration from the Office of Environment and Heritage stating whether heritage places and archaeological sites registered under the *Heritage Conservation Act 2000* occur on the area.
10. A declaration from the Aboriginal Areas Protection Authority indicating that there are no sacred sites in the area covered by the permit. If sites are present an Authority Certificate is required to indicate there is no risk of damage to the sites from the proposed timber harvesting (see section 4.11).
11. Details of any major weeds present and the measures that will be used to ensure they are not spread out of the area to be harvested.

12. Details of how regeneration will be achieved after logging (except in the case of salvage logging). This will normally involve details of how fire management will ensure adequate survival of regeneration in the five years after logging.
13. Evidence that advice has been obtained from the Natural Resources Advisory Service of the Department of Infrastructure, Planning and Environment (or another authoritative source) in relation to potential soil erosion hazards in accessing and harvesting timber from the area covered by the permit application. In the case of salvage harvesting this will have been incorporated in the clearing plan approved under clearing controls in situations where such a plan is required.
14. Details of how the area to be harvested will be accessed and what measures will be undertaken to ensure water quality and minimise erosion at crossing of watercourses or drainage lines.
15. In the case of salvage harvest, a copy of a permit granting permission to clear, along with any associated clearing plans and conditions.

Contact details for organisations that can provide relevant information and/or advice are given in Appendix A. The requirement to provide information under points 9 to 15 may be waived in the case of small-scale harvesting. What constitutes 'small-scale' will be determined on a case by case basis depending on volumes to be extracted, the area to be impacted, harvesting techniques and the environmental characteristics of the site (e.g. erosion potential).

Permits will be valid for one year from the date of issue unless the applicant has entered into a management agreement with the Parks and Wildlife Service (see section 4.15).

#### **4.2 Refusal to grant or cancellation of permit**

A permit application may be refused for the following reasons:

- The applicant is not the owner/leaseholder/traditional owner of the land for which a permit is requested.
- Advice from a relevant government body or other authoritative source indicates that unacceptable environmental impact (to soil, water, geomorphology, flora or fauna) will result from the proposed harvesting.
- A report from a relevant government body or other authoritative source has indicated that the applicant has carried out activities in the past related to timber harvesting that have led to unacceptable environmental impact (whether on the property subject to the application or elsewhere in the Northern Territory).
- The applicant has contravened the conditions of a previous permit. Refusal to reissue for up to five years may result from contravention of permit conditions.
- The area covered by the application contains threatened species or species or communities of conservation significance (e.g. monsoon forest), or will impact adversely on these species or communities in a contiguous area.
- The area covered by the application is a declared area of essential habitat under section 37 of the *Territory Parks and Wildlife Conservation Act 2001*.
- Rehabilitation works requested to be undertaken as a result of past environmental damage caused by activities related to timber harvesting have not been carried out to the satisfaction of the relevant government authority (see section 5.2).
- The area has been subject to logging in the past 20 years (see section 4.6).

A permit may be cancelled for the following reasons:

- Conditions of the permit are contravened. This may include non-payment of royalties or failure to lodge returns by the due date.
- The holder or harvester, whilst undertaking harvesting under the permit, contravenes their duty of care under government legislation or government departmental environmental guidelines.
- A management agreement (formal or informal) that has been made with the Parks and Wildlife Service is breached (see section 4.15).

The Director of the Parks and Wildlife Service reserves the right to approve or cancel a permit irrespective of the above if he/she believes that it is in the public interest or that a conservation benefit will result from doing so.

### **4.3 Royalties**

Royalties will be levied by the Parks and Wildlife Service and are published in the Government Gazette. Royalties are presently set at between \$8 to \$10 per stem for timber species. Royalties are payable for all timber harvested for commercial purposes from leasehold or Territory government owned land. Royalties are **not** payable for timber from freehold land.

Payment of royalties will be based on quarterly returns (see section 4.4) and will be due within 30 days of the due date of the return. The Director of the Parks and Wildlife Service reserves the right to waive fees and/or royalties in order to promote agreements or services that enhance conservation outcomes (see section 4.15).

### **4.4 Harvesting Returns**

As outlined in the *Territory Parks and Wildlife Conservation Act 2001*, returns providing details of harvested timber are required as a condition of all permits and are the responsibility of the permit holder. Nil returns are still required if no harvesting is undertaken in a period. The return period will be quarterly unless specified otherwise on a permit. The information is required to determine royalties and for auditing.

Information required includes:

- the permit number;
- the permit holder's name;
- the quantity (normally the number of stems) of each timber species harvested in the period;
- utilisation of the logs (e.g. milled, whole of log sold) and by whom (mill name or name of purchaser) ; and
- the locations from where the timber was harvested during the period covered by the return. The locations will be required to be obtained using a GPS so that each stump will be able to be found for the purposes of checking on compliance and auditing of returns.

The last requirement may be waived in the case of small-scale harvest.

#### **4.5 Silvicultural system**

Only selective logging will be allowed. The one exception to this is where a permit to clear native vegetation has been granted in which case all timber can be removed if the permit holder so wishes.

#### **4.6 Successive harvests in the same area**

A permit will only be issued for logging in an area where logging has previously occurred if enough time has elapsed to ensure adequate growth has occurred to justify another harvest or if the original logging only removed a low proportion of the harvestable timber. A period of twenty years will normally be imposed before reharvesting can occur in a logged area. The present information available to determine this rotation length is limited. Thus this figure will be subject to review based on new information on growth rates of different tree species on different soil types under various fire regimes (see section 7.4). It is important that the applicant for a permit does not overestimate the area to be subjected to harvesting on a permit application as no permit will be issued for logging on that parcel of land again until the time period for reharvest has elapsed. However, the twenty year period for reharvesting may be waived in cases where an applicant can provide quantitative inventory data to show that sufficient resources is available to allow harvesting.

#### **4.7 Minimum size of harvestable trees**

For salvage harvesting, trees of any size can be taken. For harvesting in areas where no clearing permit applies, a minimum size of tree permitted to be harvested will be imposed to ensure mature trees remain on the site to produce seed for regeneration after logging and to minimise impacts on flora and fauna. The minimum size will be set at 25 cm diameter at breast height over bark for species in the genera *Eucalyptus*, *Corymbia* and *Erythrophleum* and 20 cm for species from other genera. This requirement may be waived for small-scale harvesting or harvesting for poles only and will not apply to harvesting of dead wood.

#### **4.8 Retention of habitat trees**

Trees with hollows (hereafter referred to as habitat trees) are a vital resource for wildlife (see section 7.4). For the purposes of this plan a habitat tree is considered to be a standing tree (either live or dead) with a hollow entrance present that is greater than 5 cm in width in any direction. The numbers of habitat trees present will vary from area to area. If present, a minimum of five per hectare must be retained. If less than six per hectare are present no harvesting of habitat trees will be allowed.

#### **4.9 Exclusion zones**

There will be certain areas where logging will not be permitted to ensure that degradation of land resources do not occur and to aid conservation of biodiversity or to ensure compliance with government policy.

##### *Road reserves*

The removal of timber from within 100 m of a road reserve (or if there is no reserve, the centreline) of all roads to which the Highway Control Plan applies will not be permitted unless this is required for road maintenance or safety reasons.

### *Threatened species*

No harvesting will be permitted in areas where threatened species are known to occur unless there is evidence that harvesting will promote the development of suitable habitat conditions for the threatened species or the harvesting is part of a research project to examine the effects of harvesting where a beneficial relationship is expected.

### *Riparian, seepage and wetland buffers*

For the purposes of this management plan, a watercourse is a channel having well-defined beds and banks, down which surface water flows on either a permanent or semi-permanent basis, or for a substantial time after periods of heavy rainfall. An explanation of the classification of watercourse size in terms of stream order is given in Appendix B.

Prescriptions relating to the different water bodies where selective harvesting occurs are as follows:

(A) wetlands, lakes or either side of fourth or fifth-order streams i.e. major rivers or streams

Major rivers or streams (perennial or intermittent) would normally support a largely continuous band of distinct riparian vegetation at least 5 m wide. No harvesting will be permitted within 50 m from the perimeter of the outer stream channel or bank of the waterbody. From 50 to 100 m from the channel or waterbody no more than 20% of the canopy can be removed per ha.

(B) First, second and third order streams and seepage zones

No harvesting will be permitted within 30 m either side of the watercourse or around the seepage zone. From 30 to 50 m from the channel no more than 20% of the canopy can be removed per ha.

The best timber resources occur within riparian zones (Taylor *et al.* 2002) and hence the wider the exclusion zone required the greater will be the impact on the availability of timber resources.

Note that in cases where salvage harvesting is to occur in an area where permission to clear has been granted, no harvesting will be allowed within the buffers required under the clearing permit. These will be greater than prescribed above in the case of selective harvesting due to the greater impacts of complete clearing of the native vegetation and consequent greater risk of erosion and effects on water quality.

### *Steep slopes*

No harvesting will be permitted on areas with a slope greater than 10% (10 m rise in 100 m horizontal distance), due to the greater likelihood of soil erosion occurring on steeper slopes, unless an approval to clear has been granted for the area.

### *Highly erodible soils*

No permits will be issued for areas:

- declared as an area of erosion hazard; or
- subject to a soil conservation order under the *Soil Conservation and Land Utilisation Act 2001*; or
- considered by the Department of Infrastructure, Planning and Environment to have highly erodible soils.

Because of the very high rainfall in the Top End any area with a slope of greater than 0.75% is potentially erosion prone. The clearing guidelines ([www.lpe.nt.gov.au/advis/land/clearing/land/default.htm](http://www.lpe.nt.gov.au/advis/land/clearing/land/default.htm)) recommend that structural soil conservation works be undertaken on areas with slopes over 2% where tree cropping is occurring even where there is a well maintained ground cover.

#### **4.10 Timber species subject to special conditions**

Permits will not normally be issued for harvesting of timber species that are classified as threatened or Near Threatened under the *Territory Parks and Wildlife Conservation Act 2001* or are of high conservation significance (see Appendix C). For a permit to be issued for such species it would have to be demonstrated that the harvesting, or management put in place in exchange for a permit being issued, had a conservation benefit. Permits will only be issued for such species if there is a informal or formal management agreement between the landholder and the Parks and Wildlife Service under section 35 of the *Territory Parks and Wildlife Conservation Act 2001* (see section 4.15). For example, Cypress Pine *Callitris intratropica* is not threatened but has suffered a major reduction in numbers due to inappropriate fire regimes (see section 7.4). For a permit to be issued for the commercial harvesting of this species a management agreement would have to be in place to promote fire regimes that are suitable for the species in the area where harvesting was to occur.

#### **4.11 Vegetation types subject to special conditions**

Permits for the harvesting of timber from sensitive environmental areas (e.g. swamps, sand dunes) or vegetation communities of conservation significance (e.g. monsoon forest, mangroves) would normally only be issued for small-scale craftwood harvesting (see Appendix C). Salvage harvesting in such areas would be permitted in cases where a clearing permit had been issued by an appropriate government department or body. Larger scale selective harvesting may potentially be considered in cases where it can be demonstrated that a conservation benefit would accrue. This would have to be carried out under a formal management agreement between the landholder and the Parks and Wildlife Service.

#### **4.12 Sites of cultural and historic significance**

If any declared heritage place (as recorded on the Northern Territory Heritage Register) occurs on the area covered by a permit application an exclusion zone may be required for its protection. The register can be viewed at the office of the Heritage Conservation Branch, Level 2 Darwin Plaza, The Mall, Darwin or via the Department of Infrastructure, Planning and Environment's web site at [www.lpe.nt.gov.au/heritage/register/LIST/default.htm](http://www.lpe.nt.gov.au/heritage/register/LIST/default.htm). The register includes details of interim conservation orders, conservation management plans and heritage agreements. Every permit application must be accompanied by a declaration stating that the register has been checked and stating whether a registered place or object occurs on the area covered by the permit application. If a place or object does occur on the area covered by the application then a copy of advice from the Heritage Conservation Branch on the conservation requirements for the site in relation to timber harvesting activities must be included with the application.

A register of Aboriginal Sacred Sites is kept by the Aboriginal Areas Protection

Authority. Information may be sought from the Authority on the existence of sites within a given project area. The Authority will provide anyone with a *bona fide* interest in specific land with information on the location and extent of registered sites. Inspection of the Register may be made in person, by making an appointment with the Registrar of Sacred Sites in the Darwin Authority office. It can also be made in writing, or on a standard form obtainable from the Authority, enclosing a map showing the area where works are proposed. If a sacred site is present an Authority Certificate from the Aboriginal Areas Protection Authority is required to accompany the permit application to indicate that there is no risk to sacred sites in the area covered by the permit.

These requirements may be waived in the case of an application from Traditional Owners.

#### **4.13 Minimisation of environmental impacts**

There are many activities associated with timber harvesting that have the potential to cause environmental damage. Some examples are:

- transport of soil-borne diseases, such as *Phytophthora*, on machinery;
- spread of weeds via the transportation of seeds on machinery;
- creation of disturbed areas where weeds can flourish;
- erosion associated with roading, hauling of logs or loss of vegetation binding the soil; and
- sedimentation of waterways from run-off or crossing of streams by machinery.

It is the responsibility of the landowner (under the *Soil Conservation and Land Utilisation Act 2001*, the *Water Act 2001* and *Pastoral Land Act 2001*) to ensure that land is not degraded. Some relevant guidelines for best practice are provided in *Land Clearing Guidelines* and *Soil Erosion and Control Guidelines* published by the Department of Infrastructure, Planning and Environment (see [www.lpe.nt.gov.au/advis/default.htm](http://www.lpe.nt.gov.au/advis/default.htm)).

##### *Waterlogged soils*

Logging should not occur on waterlogged soils because of the high likelihood of soil damage. In the Top End the chance of this occurring will be minimised by only logging during the dry season or very early wet season.

##### *Soil degradation*

Measures to minimise soil erosion will be required both in areas used to access and to harvest timber. This covers such things as proper construction of stream crossings, locating of tracks, track drainage, and direction and distance of snigging. Advice on soil conservation issues must be sought from the Natural Resources Advisory Service of the Department of Infrastructure, Planning and Environment (or another relevant authority).

##### *Weeds*

The *Weeds Management Act 2001* requires owners and occupiers of land to be responsible for weed management and to have a duty of care to control weeds. Harvesting and roading equipment can transport the seeds of weeds. Thus it is important that machinery coming from an area with weeds be thoroughly washed (well clear of any watercourse) before being moved to an area free of weeds. This is especially important in

the case of exotic pasture species such as Gamba Grass and Mission Grass. Advice on weed control is available from the Regional Weeds Officer of the Weeds Branch of the Department of Infrastructure, Planning and Environment.

Evidence that these matters have been considered in formulating a logging plan need to be included with the permit application.

#### **4.14 Regeneration**

After harvesting, the site should be able to return to its original condition through natural regeneration. Grazing (both from stock and feral herbivores) and burning have the potential to affect regeneration. The permit holder should manage grazing and burning regimes after logging to ensure adequate regeneration and regrowth occurs. This may require the proponent to maintain active control of feral animals over the timber harvesting area. Advice on control of feral animals is available from the Parks and Wildlife Service of the Department of Infrastructure, Planning and Environment. Active prescribed burning in and/or around the logged area may be required to ensure that intense fires, that lead to the destruction of the regeneration present after logging, do not occur. Advice on fire management is available from the Bushfires Council.

#### **4.15 Cooperative management agreements**

Harvesting of timber from native vegetation is included under the *Strategy for Conservation Through the Sustainable Use of Wildlife*. This strategy seeks to foster the conservation of plants and animals and their habitats through allowing their sustainable use. The Parks and Wildlife Service will thus encourage landholders who apply for permits to undertake actions to improve conservation outcomes on the land they manage. This may simply involve management measures that would be required as a condition of the issuing of a permit. However, landholders will be encouraged to enter into informal or formal agreements relating to management that could cover other aspects of land management practices. Such agreements could potentially even apply to areas outside of the harvest area. Formal agreements are allowed for under sections 35,73 and 74 of the *Territory Parks and Wildlife Conservation Act 2001*.

Potential conservation actions could involve such things as:

- weed management;
- fire management;
- feral animal management;
- the reduction or exclusion of grazing from certain areas;
- the fencing of a sensitive site;
- agreement for an area to be nominated for listing under an international treaty (e.g. listing as a RAMSAR wetland); or
- the monitoring of wildlife.

As an inducement to enter into cooperative management agreements, permits may be issued for a period of three years (rather than the standard one year) where an informal agreement is in place and for a period of up to 10 years in the case of a formal agreement being entered into. However, these permits would be subject to any changes to permit conditions that resulted from reviews of the management plan. Royalty payments may also be waived or reduced in exchange for cooperative management agreements.

## **5. MONITORING AND ASSESSMENT OF HARVESTING AND ENVIRONMENTAL IMPACTS**

### **5.1 Monitoring**

A program to monitor the compliance with permit conditions and to check the accuracy of returns will be undertaken. This will involve a field inspection of at least one, and a minimum of 10%, of the areas covered by permits in a particular year. Inspections could potentially be undertaken up to five years after logging, in the case of fire management, to check on regeneration.

Auditing of sales information may also be undertaken to verify quarterly returns of material harvested. Permit conditions will be enforced by Conservation Officers appointed under the *Territory Parks and Wildlife Conservation Act 2001* and officers of the Northern Territory Police Force.

### **5.2 Rehabilitation**

Harvesting should be carried out in a manner that minimises environmental damage. However, if a site inspection shows that rehabilitation works are required then an existing permit will be suspended or no further permits issued until such time as this work has been undertaken to the satisfaction of the Department of Infrastructure, Planning and Environment.

### **5.3 Adaptive management**

Should monitoring indicate that management aims and objectives are not being met, permit prescriptions will be altered or other actions (e.g. cancellation of a permit) taken in accordance with this program.

## **6. REPORTING AND REVIEW OF PROGRAM**

Information on timber harvesting will be reported by the Parks and Wildlife Service as part of the review of this program. This will detail the number of permits issued, the areas subjected to harvesting, the numbers of each species taken, the number of formal and informal management agreements resulting from timber harvesting approvals and the results of the compliance checks.

A review of the program, as required under Section 32 of the *Territory Parks and Wildlife Conservation Act 2001*, will be carried out within five years of the Management Program being approved. The Parks and Wildlife Service reserves the right to undertake a review before that time if the level of harvesting increases substantially over historic levels or if monitoring shows that aspects of the management plan are deficient in achieving the aims of the plan. The development of a detailed Code of Practice could be required under such circumstances.

## 7. BACKGROUND

### 7.1 History of the timber industry in the Northern Territory

The history of timber harvesting in the Northern Territory is discussed by Lacey (1979), Hanssen and Wigston (1989) and Woinarski and Dawson (2001). Timber harvesting as a full time occupation began in the Northern Territory with the establishment of Darwin (then Palmerston) in the 1860s. Small-scale harvesting has been undertaken for a long time with particular emphasis on termite resistant species such as Ironwood *Erythrophleum chlorostachys* and Cypress Pine *Callitris intratropica*. The rate of use of these species in the Northern Territory in the past, at least at a regional level, has clearly been unsustainable. Inadequate information on the resource and lack of management planning and protection contributed towards the rapid depletion of Ironwood in the Darwin-Katherine area within the first few decades of European settlement (Hanssen and Wigston 1989; Woinarski and Dawson 2001). As the settlements, cattle stations and mining enterprises grew, ironwood was utilized without any thought of sustainability or any considerations as to its regeneration (Hanssen and Wigston 1989).

*“Ironwood trees, although only found in relatively small scattered stands, fell by their tens of thousands up to 1889 to act as sleepers to support the steel narrow gauge track to Pine Creek. Although ironwood logs have been known to last for up to 100 years, the species is slow growing, of poor timber form, and has a low regeneration rate. The poor form leads to much waste of material; the scattered remains of branches around a cut stump used to make perhaps one to four sleepers can still be observed in the bush in a broad sweep along the old route of the railway ...”* (Hanssen and Wigston 1989).

The formation of a Forestry Research Station in 1959 led to a push to develop a timber industry using both native species and plantation grown timber. Plantations were established on Melville Island and a mill was established at Maningrida as a means of providing an independent source of income for the Aboriginal community. In 1978 a report of the House of Representatives Expenditure Committee concluded that the Forestry Branch had exaggerated the potential of a forest industry in the Territory (Woinarski and Dawson 2001). In 1989 a licence was granted for the harvesting of 360 000 tonnes of Lancewood *Acacia shirleyi* and Gutta-percha *Excoecaria parvifolia*. However, after several years the operation was abandoned with only 200 tonnes having been cut.

### 7.2 Recent trends in timber harvesting in the Northern Territory

Superficially, timber resources in the Top End appear unlimited with little clearing having occurred and large areas still covered in forest and woodland. However, this superficial appearance is misleading. A very large proportion of timber suffers from defects, making it unsuitable for milling or large-scale commercial woodchipping. This defect mainly relates to the incidence of termite damage. However, the growth form of many trees is also not conducive to milling with short boles and major branching and boles often being of poor form. For example, on the Mary River East property Taylor *et al.* (2002) found that only 26% of Ironwood and 16% of *Eucalyptus/Corymbia* stems

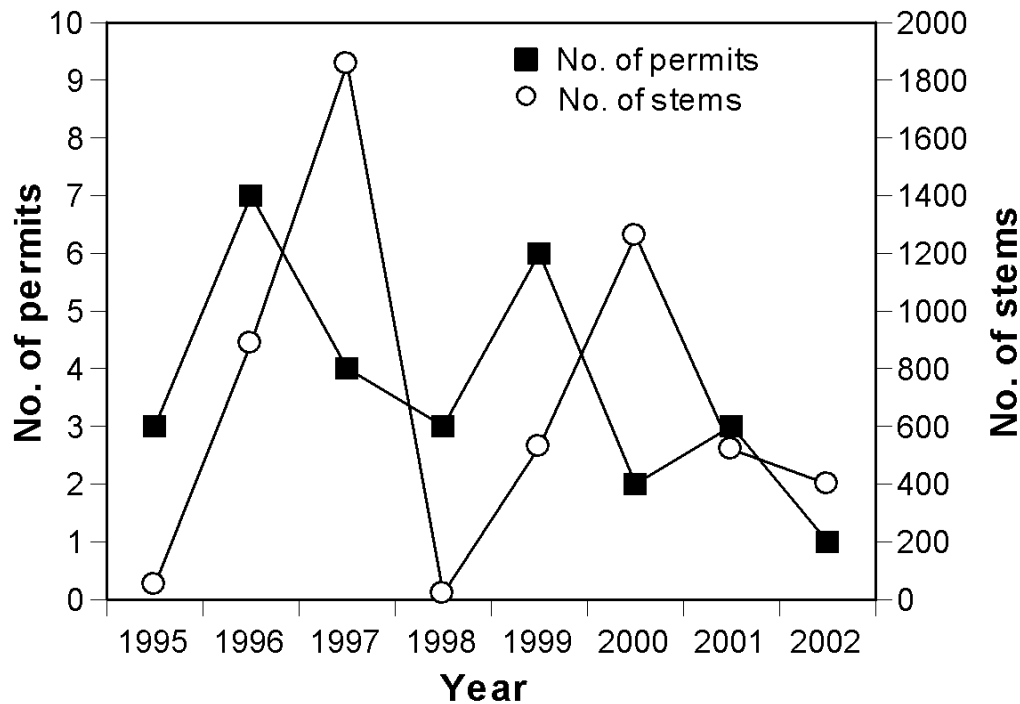
were of commercial value (defined as a stem with a diameter at breast height (DBH) >35 cm, a bole height of >2.2 m and no hollows or major irregularities) in riparian areas with the equivalent values in non-riparian areas being 0 and 3%. There would be some areas where yields would be higher but it is likely that the majority of Northern Territory eucalypt forests would have high defect levels. Braithwaite *et al.* (1985) examined termite damage in trees in different habitat types in Kakadu National Park. The incidence of piping from termites increased steeply with tree size being around 30% at 10-14 cm DBH and rising to around 95% in trees 50+ cm DBH. Termite damage was high in all habitats except monsoon forest. In savanna the most common tree species (*E. tetradonta*, *E. miniata* and *C. porrecta*) had the most termite defect.

Today harvesting of native forests is regulated by the Parks and Wildlife Service of the Department of Infrastructure, Planning and Environment with the Department of Business, Industry and Resource Development overseeing a small farm forestry plantation program. A large-scale plantation development using an acacia (*Acacia mangium*) not native to the Northern Territory is proceeding on Aboriginal land on Melville Island.

Data on harvesting of native timbers (live large stems) from permits issued between 1995 (when electronic record keeping commenced) and 2002 is given in Fig. 1. In 1997 four permits were issued for the same area. This was recorded as a single permit. In 1998 a permit was issued to the Tiwi Land Council to harvest 40,000 stems as salvage from plantation development on Melville Island. However, no timber was used commercially and so these data were not included. Permits for the collection of dead wood were also not included.

The numbers of stems permitted to be harvested is not necessarily the same as the number actually harvested. Permit holders are required to supply returns indicating the numbers of stems actually cut. However, the major harvester of Ironwood over the period 1995-2001 did not supply adequate returns and was eventually refused another permit. Hence the permitted harvest probably better reflects the actual harvest than data in returns. 53% of the stems permitted to be taken in the period 1995-2002 were from the Mary River East property. In 1999 76% of the stems taken were for woodchipping (probably for garden use). An (unknown) proportion of the stems included in these figures would have been used as craftwood. Harvesting of small stems (principally *E. phoenicea*, *E. miniata* and *E. tetradonta*) also occurs for didgeridoo manufacture but these are not included in Fig. 1.

A list of all species permitted to be harvested for timber or craftwood over the period 1995-2002 is given in Appendix C. In relation to harvesting for timber Ironwood *Erythrophleum chlorostachys* is the most frequently harvested species (53% of stems) with smaller numbers of eucalypts (40%) and a range of other species taken. Ironwood is probably favoured because of its termite resistance and valuable timber.



**Fig. 1.** Number of permits issued for timber harvesting in the Northern Territory and the number of stems allowed under these permits.

Broad scale harvesting of timber for art and crafts occurs within many Aboriginal communities. Griffiths *et al.* (2003) quantified the use in the Maningrida region of a rainforest tree *Bombax ceiba* that is used for sculpture. A cumulative harvest over 20 years of 6% was assessed to be sustainable.

### 7.3 Ecologically sustainable timber harvesting

Ecological sustainability takes account of the impact of timber harvesting on environmental, economic and social values, not just those related to the sustainability of wood production (Buschbacher 1990). For harvesting to be ecological sustainable it needs to be undertaken in a manner and at a rate that does not lead to unacceptable or long-term detriment to the environment.

The maximum sustainable yield of a forest is the maximum level of commercial timber that can be maintained under a given management regime. The determination of the sustainable rate of harvesting requires a knowledge of the following:

- Standards of utilisation i.e. what constitutes a useable tree for utilisation as timber. This will in turn govern rotation length. Also relevant are silvicultural prescriptions that require retention of trees e.g. large mature trees retained as seed trees.
- Area of forest available for harvesting. This potentially includes all areas with forest whose tenure allows timber harvesting. Areas such as gazetted conservation reserves would not be included. Areas excluded by regulation for environmental reasons would also not be included e.g. areas >10% slope or within riparian reserves or excluded to ensure protection of biodiversity or other values. Also excluded would

be areas that were unavailable for other reasons e.g. areas uneconomic to access due to being too far from roads or having insufficient resource to warrant utilisation.

- Inventory and growth. Inventory data required are volumes of timber in different stratum that have similar growth rates e.g. saplings, poles, adults. Growth rates across the life span of the species are required. Inventory data would need to be updated to take account of major mortality factors such as logging and cyclones.
- Regeneration and recruitment. Recruitment rates for seedlings into the sapling stage and subsequent survival rates into adulthood are required to assess recruitment of trees to a size where they are commercially utilisable. These values would differ depending on site factors (soil and moisture are likely the most important factors) and environmental conditions (fire regime is likely to be the most important factor).

However, for harvesting to be demonstrated to be *ecologically* sustainable it is also necessary to ensure impacts on soil and water resources are environmentally and socially acceptable and that no long term changes to flora and fauna occur when measured over appropriate spatial scales.

#### **7.4 Present knowledge base**

In southern states, where a large-scale timber industry operates (although increasingly in plantations rather than in native forest), detailed Codes of Practice have been developed for the forest industry. Dedicated government staff and financial resources are available to determine sustainable yields, assess impacts of logging on environmental values, develop appropriate prescriptions, provide advice and draw up detailed logging plans for individual harvesting units. Given the small scale of the timber industry in the Northern Territory, the meagre resources available and our lack of knowledge such an approach for native forests is presently not possible here. A Code of Practice has been developed by DBIRD for plantation development and is now awaiting approval by the Federal minister.

Our level of knowledge in relation to information required to determine sustainable yields for Northern Territory timber species is poor. Little detailed inventory data are available and information on growth rates is limited. No studies have been conducted into the impacts of logging on natural or cultural values. However given adequate financial resources it would be possible to develop demographic models that would allow an approximate determination of ecologically sustainable harvest levels at a regional level.

This section highlights the main relevant information available for each of the major timber species or forest communities.

##### *Ironwood*

Recent work (Taylor 2002) has substantially increased our knowledge of ironwood *Erythrophleum chlorostachys*, the most frequently used timber species in the Northern Territory. This work includes:

- a summary of all relevant information on ironwood up to 2001;
- modelling of the distribution and abundance of ironwood at the Territory and catchment scale;
- approximate resource estimates, both for the species as a whole and for commercial stands in areas where logging might potentially be allowed;

- patterns of occurrence of hollows in ironwood, *Eucalyptus camaldulensis*, *E. microtheca*, *E. polycarpa*, *E. miniata* and *E. leucophloia*;
- a comparison of regeneration in logged and unlogged sites; and
- a review of the limited data on growth rates.

#### *Cyperus Pine*

*Callitris intratropica* appears to have undergone a decline since European settlement. This species is fire sensitive, with low intensity fires with a mean period between 2 to 8 years required to maintain a healthy stand (Price and Bowman 1994). The cessation of traditional Aboriginal fire management and a trend to uncontrolled fire regimes has led to a widespread crash in populations of this species (Bowman and Panton 1993; Bowman and Price 2001; Yibarbuk *et al.* 2001).

#### *Eucalypts and Corymbias*

*Eucalyptus/Corymbia* open-forest and woodlands are by far the most common forest type in the Northern Territory. Of the five *Eucalyptus/Corymbias* utilised as timber to the greatest extent i.e. *Corymbia bleeseri*, *C. polycarpa*, *C. foelscheana*, *Eucalyptus. miniata* and *E. tetradonta*, most is known about the latter two species, these being the most widespread and abundant species in the savannas. A large number of studies have been conducted on savanna trees but most involve an examination of pattern and ecological processes. Fewer studies deal with topics of direct relevance to determining sustainable harvest rates. Regeneration is discussed by Lacey (1974), Bowman (1986), Fensham (1992) and Fensham and Bowman (1992), and the effects of fire on mortality by Braithwaite and Estbergs (1985), Bowman *et al.* (1988), Lonsdale and Braithwaite (1991) and Williams *et al.* (1999a). Information on phenology and seed production is presented by Setterfield (1997), Setterfield and Williams (1996) and Williams *et al.* (1999b). Werner and Murphy (2001) and O'Grady *et al.* (2000) provide allometric relationships between DBH and aboveground biomass. Growth and/or aging is discussed by Mucha (1979) and Werner (1986).

#### *Monsoon forest*

Monsoon forests occur in small (often less than several hectares) fire protected patches (Russell-Smith 1991). Populations of adult plants are typically very small and isolated (Russell-Smith and Lee 1992). This vegetation type has increased in occurrence in some areas (Bowman *et al.* 2001) but in most areas has declined due to a trend towards more intense fires (Panton 1993; Bowman 1994). Aboriginal use of monsoon forest trees (principally *Bombax ceiba*) for wood carvings and its sustainability is discussed by Philips (2001) and Griffiths *et al.* (in press). Harvest of trees in this vegetation type can potentially be more damaging than in savanna because of the small population sizes, fire sensitivity and the increased probability of encroachment by fire associated with disturbance from logging.

#### *Mangroves*

Mangrove forests occur in intertidal areas in coastal and estuarine environments. They play an important role in coastal protection, reducing erosion from cyclones and lessening the impact of storm surge. Mangroves are also important to recreational and commercial fisheries as they provide breeding, feeding and nursery areas for marine species. Information on mangroves in the Northern Territory can be found at

[www.lpe.nt.gov.au/advis/land/mangrove](http://www.lpe.nt.gov.au/advis/land/mangrove). Only very small numbers of mangrove trees were permitted to be taken between 1995-2002. Because of the importance and sensitivity of this community only very small-scale harvesting would be allowed.

#### *Impacts on wildlife*

There is a wealth of literature from other areas in Australia and overseas showing that logging has negative impacts on some species of flora and fauna and leads to an increase in populations of other species (Heliovaara and Vaisanen 1984; Taylor 1991; Hickey 1994; Lindenmayer and Franklin 2002). The exact impacts depend on the type and extent of logging. Some groups such as hollow-dependent fauna have been highlighted as being particularly at risk and requiring special prescriptions (Gibbons 1995). Although there are no studies of the impacts of logging on flora or fauna in northern Australia, it is likely that some species will be adversely impacted. However, because of the small scale of commercial harvesting to date (except in the case of clearing for plantation development on the Tiwi Islands) the impact of this land use is likely to have been minor.

Geoff Pitmann (pers. comm) estimated the density of habitat trees (i.e. trees with at least one hollow with an entrance of 5 cm or greater) in forests around Humpty Doo to range between 6 and 8 per ha and Taylor (2002) estimated densities of such trees to vary between 25 and 48 per ha in different habitats in Limmen National Park in the Gulf region. Because of the possibility of impacts on hollow dependent fauna a prescription has been included in the plan for retention of habitat trees. However, because the main reason for the harvest of trees from native forest has been for timber (rather than for woodchips) it is unlikely that there has been a great impact on habitat trees. The occurrence of defect in such trees makes it unlikely that they will be harvested for timber.

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## APPENDIX A. Contact details

Contact details of government organisations that may need to be contacted for maps or information required for a permit application under this management plan (see section 4.1) are given below.

### TOPOGRAPHIC MAPS AND AERIAL PHOTOGRAPHY

#### Maps NT

Darwin: 1<sup>st</sup> Floor, Nichols Place Ph: 8999 7032  
Cnr Cavenagh & Bennett Streets Fax: 8999 7750

Alice Springs: AFT Building Ph: 8951 5316  
21 Gregory Terrace

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

### ARCHAEOLOGICAL & HERITAGE SITES

#### Office of Environment & Heritage

Darwin: 2<sup>nd</sup> Floor Ph: 8999 7743  
Darwin Plaza Fax: 8999 6239  
Smith Street Mall

Alice Springs: Natural Resources Building Ph: 8951 8632  
55 North Stuart Highway

### ABORIGINAL SACRED SITES

#### Aboriginal Areas Protection Authority

Darwin: Ground Floor Ph: 8981 4700  
TII Building Fax: 8981 4169  
74 Cavenagh Street

Alice Springs: Belvedere House Ph: 8952 6399  
Cnr Bath & Parsons Street Fax: 8952 2824

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

### SOILS, WATER AND VEGETATION

#### Natural Resources Advisory Service, Department of Infrastructure, Planning and Environment

Palmerston: 4<sup>th</sup> Floor, Goyder Centre Ph: 8999 4455  
25 Chung Wah Terrace Fax: 8999 3667

Katherine: Randazzo Centre Ph: 8973 8100  
16 Katherine Terrace Fax: 8973 8122

Alice Springs: Natural Resources House  
55 North Stuart Highway Ph: 8951 8603

## **LAND CLEARING**

### **Natural Resources, Department of Infrastructure, Planning and Environment**

Palmerston: 3<sup>rd</sup> Floor Ph: 8999 3467  
Goyder Centre Fax: 8999 4445  
25 Chung Wah Terrace

Katherine: Randazzo Centre Ph: 8973 8101  
Fax: 8973 8122

## **THREATENED SPECIES**

### **Parks and Wildlife Service, Department of Infrastructure, Planning and Environment**

Palmerston: 2<sup>nd</sup> Floor Ph: 8999 4400  
Goyder Centre Fax: 8999 4793  
25 Chung Wah Terrace

Katherine: Randazzo Centre Ph: 8973 8857

Alice Springs Arid Zone Research Institute Ph: 8951 8249

## **WEED MANAGEMENT**

### **Weeds Branch, Department of Infrastructure, Planning and Environment**

Darwin: Berrimah Farm Ph: 8999 2348  
Berrimah

Katherine Katherine Research Station Ph: 8973 8117  
16 Katherine Terrace Fax: 8973 8122

Alice Springs Arid Zone Research Institute Ph: 8951 8123  
Stuart Highway

## **FIRE MANAGEMENT**

### **Bushfires Council, Department of Infrastructure, Planning and Environment**

Darwin: 17/18 Albatross Street Ph: 8922 0844  
Winnellie Fax: 8922 0833

Katherine Giles Street Ph: 8973 8888  
Fax: 8973 8899

Alice Springs Elder Street Ph: 8951 8279  
Fax: 8952 7576

## **FERAL ANIMAL MANAGEMENT**

### **Parks and Wildlife Service, Department of Infrastructure Planning and Environment**

Palmerston: 2<sup>nd</sup> Floor, Goyder Centre

Ph: 8999 4463

Fax: 8999 4793

Katherine Giles Street

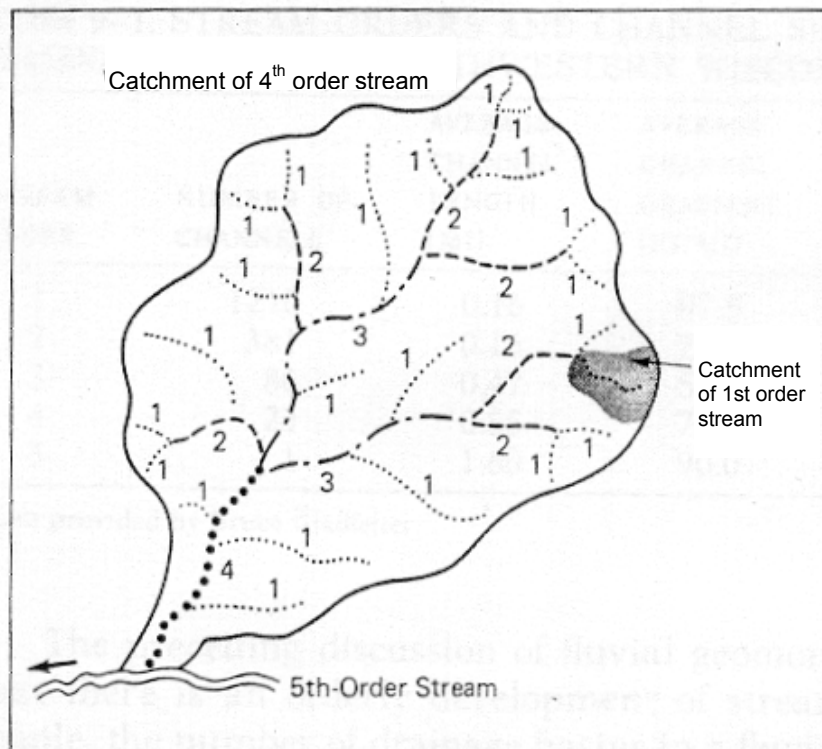
Ph: 8973 8877

Alice Springs Arid Zone Research Institute

Ph: 8951 8239

## APPENDIX B. Stream orders

Watercourses can be classified according to their sequence in a drainage system. A watercourse for the purposes of this management plan is a channel having well-defined beds and banks, down which surface water flows on either a permanent or semi-permanent basis, or for a substantial time after periods of heavy rainfall. The smallest watercourses in a catchment are first-order streams and have no tributaries. Stream order increases as two streams merge. Thus two first order streams join to form a second-order, two second-order streams join to form a third-order stream and so on (see figure below).



Stream order can be determined from a topographic map (preferably 1: 100 000 or finer scale). An example is shown in Appendix A of *Land Clearing Guidelines* available on the internet at [www.lpe.nt.gov.au/advis/land/clearing/default.htm](http://www.lpe.nt.gov.au/advis/land/clearing/default.htm).

## APPENDIX C. Tree species used for timber or craftwood

Species of trees that have been permitted for harvesting as timber or craftwood from 1995 to 2002 are given below.

\* = most frequently harvested timber species.

# = species classified as Near Threatened or that have declined in historical times or that occur wholly or predominantly in sensitive sites for which permits would only be issued if their harvest was part of an overall management agreement between the landholder and the Parks and Wildlife Service unless only required in very small quantities or taken under an approved clearing permit.

Botanical Names	Common Names	Occurrence in sensitive sites
Bombacaceae		
<i>Camptostemon schultzei</i> <sup>#</sup>	Kapok Mangrove	mangroves
Burseraceae		
<i>Canarium australianum</i> <sup>#</sup>	Mango Bark	often in monsoon forest
Caesalpiniaceae		
<i>Erythrophleum chlorostachys</i> <sup>*</sup>	Ironwood	
<i>Peltophorum pterocarpum</i> <sup>#</sup>	Yellow Flame Tree	monsoon forest
Casuarinaceae		
<i>Allocasuarina decaisneana</i>	Desert oak	
Combretaceae		
<i>Lumnitzera racemosa</i> <sup>#</sup>	White-flowered Black Mangrove	mangroves
<i>Terminalia arostrata</i>	Nutwood	
<i>Terminalia ferdinandiana</i>	Billy Goat Plum	
Cupressaceae		
<i>Callitris intratropica</i> <sup>*#</sup>	Cypress Pine	
Meliaceae		
<i>Xylocarpus granatum</i> <sup>#</sup>		mangroves
Mimosaceae		
<i>Acacia aneura</i>	Mulga	
<i>Acacia aulacocarpa</i>	Black Salwood	
<i>Acacia auriculiformis</i>	Black Wattle	
<i>Acacia estrophiolata</i>	Southern Ironwood	
<i>Acacia plectocarpa</i>		
Myrtaceae		
<i>Corymbia bella</i>	Ghost Gum	
<i>Corymbia bleeseri</i> <sup>*</sup>	Bloodwood	
<i>Corymbia foelscheana</i> <sup>*</sup>		

<i>Corymbia polycarpa</i> *	Longfruit Bloodwood	
<i>Eucalyptus camaldulensis</i>	River Red Gum	
<i>Eucalyptus miniata</i> *	Darwin Woollybutt	
<i>Eucalyptus phoenicea</i>	Scarlet Gum	
<i>Eucalyptus tetradonta</i> *	Darwin Stringybark	
<i>Eucalyptus tintinnans</i>		
<i>Melaleuca leucadendra</i> #	Paperbark	swamps and drainage lines
<i>Xanthostemon paradoxus</i>		
Proteaceae		
<i>Grevillea pteridifolia</i>	Fern-leaved Grevillea	
Poaceae		
<i>Bambusa arnhemica</i>	Bamboo	
Rhamnaceae		
<i>Alphitonia excelsa</i>	Red Ash	sometimes in monsoon forest
Rhizophoraceae		
<i>Bruguiera gymnorrhiza</i>		mangroves
Sterculiaceae		
<i>Brachychiton diversifolius</i> #	Kurrajong	sometimes in monsoon forest
Verbenaceae		
<i>Avicennia marina</i>	White Mangrove	mangroves

Other woody species with potential to be commercially utilised for timber or craftwood in the Northern Territory are listed below. This list is not exhaustive. Species with this potential that are threatened or near threatened are not included.

Anacardiaceae		
<i>Buchanania obovata</i>	Green Plum	
Apocynaceae		
<i>Alstonia actinophylla</i>	Milkwood	sometimes in monsoon forest
Bombacaceae		
<i>Bombax ceiba</i> #	Silk Cotton Tree	monsoon forest
Casuarinaceae		
<i>Casuarina equisetifolia</i> #	Coastal Sheoak	coastal dunes
Euphorbiaceae		
<i>Excoecaria parvifolia</i>	Guttapercha	
Fabaceae		
<i>Pongamia pinnata</i> #	Indian Beech	monsoon forest
Hernandiaceae		

<i>Gyrocarpus americanus</i> <sup>#</sup>	Stinkwood	often in monsoon forest
Mimosaceae		
<i>Acacia shirleyi</i>	Lancewood	
<i>Albizia lebbek</i> <sup>#</sup>	Indian Siris	monsoon forest or sand dunes
Myrtaceae		
<i>Eucalyptus bigalerita</i>	Northern Salmon Gum	
<i>Eucalyptus brevifolia</i>	Snappy Gum	
<i>Eucalyptus confertiflora</i>	Broad-Leaved Carbeen	
<i>Eucalyptus latifolia</i>	Round-Leaved Bloodwood	
<i>Eucalyptus nesophila</i>	Melville Island Bloodwood	
<i>Melaleuca dealbata</i>	Blue-Leaved Paperbark	
<i>Syzygium armstrongii</i>		
<i>Xanthostemon paradoxus</i>	Bridal Tree	
Rubiaceae		
<i>Nauclea orientalis</i> <sup>#</sup>	Leichhardt Pine	monsoon forest
Rhizophoraceae		
<i>Carallia brachiata</i> <sup>#</sup>		monsoon forest