

WEEDS OF NATIONAL SIGNIFICANCE

**MIMOSA**

*(Mimosa pigra)*

**Strategic Plan**

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This strategy was developed under the leadership of the Dept of Primary Industry and Fisheries NT with full cooperation of all the States, Territories and Commonwealth of Australia.

Comments and constructive criticism are welcomed as an aid to improving the process and future revisions of this strategy.

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## EXECUTIVE SUMMARY

This document is a strategic plan to protect Australia from the weed impacts of *Mimosa pigra* (mimosa) and to restore infested natural habitats and productive lands and waters by integrated and cost-effective research, planning, implementation and management.

Mimosa is a woody invasive shrub that originates from tropical America and has now become widespread throughout the tropics.

In Australia, mimosa is currently restricted to the Northern Territory where it infests approximately 80,000 hectares of coastal floodplain. Mimosa predominantly threatens wetlands as well as coastal and sub-coastal areas in Queensland and Western Australia, where it could establish and rapidly flourish.

Mimosa has many negative impacts on the social, cultural, economic and environmental values of northern Australia.

This strategy outlines four management programs to prevent further spread and to minimise the impacts of mimosa across its current range.

The vision of the strategy is that:

**Australia is protected from the adverse impacts of *Mimosa pigra*, and infested natural habitats and productive lands and waters are restored.**

The Mimosa Strategy incorporates four interdependent and integrated programs. The desired outcomes of the strategy are that:

- Stakeholders are informed and educated about mimosa and appropriate land management strategies for its control and prevention of spread.
- The spread of mimosa is prevented.
- The knowledge base and integrated methods for effective and efficient management of mimosa are further developed.
- The adverse impacts of mimosa are reduced.
- The progress towards achieving these outcomes will be evaluated as part of a five year review cycle.

## THE CHALLENGE

Mimosa is one of Australia's worst environmental weeds. It has received national and international recognition because of its existing and potential impact on biological diversity. It also affects traditional and non-traditional land use, and the sustainability of agriculture and tourism.

Mimosa infestations are currently restricted to the Northern Territory. Mimosa could, however, spread across the coastal and sub-coastal plains and river systems of northern Australia. There is a national urgency to prevent the weed spreading from the Northern Territory and invading Western Australia and Queensland (Appendix 1). It could become a weed in many new situations including irrigated cropping and rainforest margins.

In ideal conditions, infestations are capable of doubling in area every one and a half years.

Much progress has been made on research towards biological and other forms of mimosa control. Control strategies are the result of an extensive and integrated research program with more than 80 published papers on mimosa. Control efforts are supported by land managers, government and non-government agencies and the public.

Continuity of funding is essential if research results and their implementation are to be effective in controlling mimosa.



**C. Wilson** *Mimosa pigra* on a Northern Territory floodplain. Flower buds are shown in the top insert and seed pods and leaves are shown in the bottom insert.

# 1 BACKGROUND

Mimosa has achieved national and international significance because of its degradation of biological diversity, areas of cultural significance, and industries such as agriculture and tourism.

Research and control has been carried out variously by the Commonwealth and NT Governments since 1965.

## 1.1 The biology of mimosa

Mimosa is a leguminous, thorny shrub up to 6 m in height. Isozyme analysis of the seeds has shown that mimosa populations in the NT are genetically uniform, suggesting that they may have originated from a single infestation or possibly a single plant.

Under ideal conditions, plants can begin flowering 6 to 8 months after germination. Flower heads are about 1 cm in diameter. Each flower head contains about 100 flowers. A typical mimosa stand comprises one plant per square metre and produces 9,000 seeds per square metre of canopy. However, isolated plants cover larger areas and can produce up to 220,000 seeds per year. Seed pods are covered with bristles that help the seed pod segments to float and be spread by water.

Mimosa is hard seeded. Seeds can survive at least 23 years on sandy soils, but seed viability decreases more rapidly on clay soils.

## 1.2 History of spread

Mimosa is a native of tropical America, where it grows as a small shrub. It was probably introduced into Australia at the Darwin Botanic Gardens in the 20 years prior to 1891. Mimosa was not found outside the Darwin City area until 1952 when it was noticed upstream from the Adelaide River township about 100 km south of Darwin.

During the 1970s, following several years of above-average rainfall and heavy impact of feral Asiatic water buffalo, mimosa spread down the floodplains of the Adelaide River. Large infestations subsequently developed on the flood plains of the Mary and East Alligator Rivers to the east, and of the Finniss and Daly Rivers to the south-west of the Adelaide River. By 1989, mimosa

covered about 80 000 ha of floodplains. In the early 1990s mimosa was recorded across a 700 km arc from the south east Arnhemland to the Phelps River, about 100 km from the Western Australian border (Appendix 1).

Within catchments, floating seeds are spread by floodwaters. Between catchments, spread occurs by human activity such as vehicle movement and by animals such as buffalo, cattle, horses and wallabies.

## 1.3 Summary of impacts

Current Impacts of mimosa

### *Environmental*

The current impacts on northern Australia's biological diversity are:

- over 80,000 hectares of native vegetation on wetlands has been replaced by mimosa;
- suitability of habitat for fauna such as magpie geese and other water birds has been reduced;
- wetlands of national and international significance are threatened; and
- rare and vulnerable plant species are threatened, including the palm *Ptychosperma bleeseri*, the aquatic plant *Monochoria hastata*, and several species of endemic water lily.

### *Indigenous land use*

The current impacts on Aboriginal land use are:

- access to land and water resources has been reduced;
- availability of traditional food such as fish, turtles and water birds over large areas has been reduced;
- sacred sites and sites of cultural significance have been changed; and
- current and potential uses of land in accordance with Aboriginal aspirations are reduced. Such uses may include tourism, crocodile egg harvesting and pastoral production.

### *Pastoralism*

The profitability of a component of the Northern Territory's \$180 million per year pastoral industry has been affected by mimosa through:

- reduced grazing and water resources;
- increased costs (\$0.25 million will be spent by pastoralists on their share of the herbicide subsidy in 1999/00 plus other costs for labour and revegetation); and
- increased difficulties in stock management, infrastructure maintenance and feral animal control.

#### *Tourism*

Some aspects of the Northern Territory's \$718 million per year tourist industry have been affected by:

- perceptions of degraded natural landscapes through effects on wetland vistas and scenery;
- reduced wildlife attractions;
- reduced area and access for tourism activities; and
- reduced access to fishing, hunting and scenic areas.

#### **1.4 History of research and control**

In 1913, an unsuccessful attempt was made to control mimosa and other noxious weeds in the Darwin Botanic Gardens. Since 1965, the Northern Territory Department of Primary Industry and Fisheries (DPIF) and its predecessors have controlled mimosa on some pastoral properties and some crown lands.

DPIF also administers the *Noxious Weeds Act 1962* which delegates responsibility for control to landowners and managers through the serving of a notice to eradicate or control a noxious weed. Landholders have been encouraged to accept their responsibility for mimosa control and today substantial control is funded and carried out by landholders.

Current activities by DPIF include an assistance scheme which subsidises the cost to land managers of aerial and ground application of herbicides. The value of the 1999/00 subsidy was \$0.38 million.

DPIF also contributes to mimosa control on pastoral and other lands in the form of

surveys, training, advice and supervision, together with the rearing, release and monitoring of biological control agents. In 1999/00 this contribution is expected to be about \$1.08 million.

In Kakadu National Park, a program to search for and eradicate new mimosa outbreaks has operated since 1981 by Parks Australia and its predecessors. Half a million dollars of Commonwealth funds is allocated to this program as part of Kakadu's operations budget (1996/97 figures). This program has successfully kept Kakadu free of mimosa and provides a model for preventing spread in areas that are currently relatively free of the weed.

Since 1979, CSIRO and DPIF have collaborated in a program to study the ecology of mimosa and to develop biological, herbicidal, and other mimosa control methods. \$2.75 million of Commonwealth funds was provided through the 1989 and 1992 Prime Ministers' Statements on the Environment. CSIRO and DPIF are each providing an additional contribution valued at \$0.5 million per year.

CSIRO is studying and selecting biological control agents in mimosa's native range and testing them in quarantine. DPIF is responsible for mass rearing and release of biological control agents while CSIRO is evaluating their impact and ecology in the field. Nine insects and two pathogenic fungi have been released to date (Appendix 2). Another insect has been approved for release and others are being investigated. Results of these combined efforts are encouraging. Some agents are starting to reduce the vigour and seed production of mimosa plants in the field.

In 1996/97 the Mimosa Steering Committee (MSC) administered the commitment of \$0.8 million of Commonwealth National Weed Strategy funds on biological control and chemical control of mimosa on Aboriginal lands.

In Arnhem Land, at Kunbarllanjnja (Oenpelli), immediately to the east of Kakadu, a mimosa infestation doubled in area every one and a half years during the 1980s covering more than 7000 hectares by 1991. This infestation has now been controlled under a

collaborative program involving the Northern Land Council (NLC), the Kunbarllanjja community, DPIF, CSIRO, Parks Australia North and the Parks and Wildlife Commission of the Northern Territory (PWCNT), and supported by \$7 million of Commonwealth funds. As a result of this program, wildlife has returned and the Kunbarllanjja community can again use the land in traditional ways. Significant ongoing commitment to prevent re-invasion is required from the Kunbarllanjja community, DPIF and the Indigenous Land Corporation.

### **1.5 A national threat**

Unless effective and efficient management is implemented and maintained, the adverse impact of mimosa on biological diversity, Aboriginal land use, and recreation, as well as on agriculture, tourism, and other industries across northern Australia will increase. Therefore, its spread must be prevented and better control of large infestations achieved.

If mimosa continues to spread, large stands could develop very quickly in pastoral and agricultural areas of eastern Queensland and in the Ord River region of Western Australia. The cost of mimosa control under these circumstances would be exorbitant.

The control of outlying satellite infestations is vital to prevent the spread of mimosa on Aboriginal land in Arnhem Land, Kakadu National Park and the Daly River Port Keats Land Trust. A coordinated and collaborative approach involving all responsible government and non-government agencies and land managers is required to implement this Strategy effectively.

A case will be made for recognising the invasion of mimosa in the wetlands of northern Australia as a key threatening process under the Commonwealth *Endangered Species Protection Act 1992* because mimosa adversely impacts on the habitat of at least 7 species of threatened or vulnerable vertebrates and at least 7 species of threatened or vulnerable plants.

### **1.6 A national approach to mimosa management**

The National Weeds Strategy provides the mechanism to reduce the adverse impacts of

weeds on the sustainability of Australia's natural environment and productive capacity.

Key elements of the National Weeds Strategy stress the importance of weeds as factors in land and water degradation in both developed and natural ecosystems. It also acknowledges that an historical focus on successful primary industries has inadvertently assisted the invasion of natural ecosystems by alien plants.

The National Weeds Strategy emphasises that action to address these problems must be coordinated and integrated both between the variety of resource managers responsible and across all ecosystems of the bioregions involved.

Key areas of activity of the National Weeds Strategy are to prevent the development of new weed problems through quarantine processes and to reduce the adverse impacts of existing weed problems of national significance.

To reduce the adverse impacts of mimosa, it is critical not only to continue to ameliorate its impacts in existing areas, but also to prevent it spreading to places currently unaffected, such as Queensland, Western Australia and areas in the Northern Territory.

Mimosa control must be collaborative because the mimosa problem crosses many land tenure boundaries within and between catchments. Therefore, it is in the strategic interest of all involved to take a national approach to the management of mimosa.

### **1.7 Principles underpinning the plan**

The strategic plan was based on the four principles of the National Weeds Strategy.

- Weed management is an essential and integral part of the sustainable management of natural resources and the environment, and requires an integrated multidisciplinary approach.
- Prevention and early intervention are the most cost-effective techniques that can be deployed against weeds.
- Successful weed management requires a coordinated national approach that involves all levels of government in establishing appropriate legislative,

educational and coordination frameworks in partnership with industry, landholders and community.

- The Primary responsibility for weed management rests with landholders/land managers, but collective action is necessary where the problem transcends the capacity of the individual landholder/land manager to address it adequately.

### **1.8 Relevance to other strategies**

The Mimosa Strategy is consistent with the National Weeds Strategy and the NT Weeds Management Strategy 1996–2005.

The Mimosa Strategy is compatible with national strategies such as the National Strategy for Ecologically Sustainable Development and the National Strategy for the Conservation of Australia's Biological Diversity, and also with Northern Territory regional strategies such as the Mary River Land Use Strategy and with local catchment and property management plans.

### **1.9 Process of strategy development**

The Mimosa Strategic Plan was developed cooperatively by the Mimosa Steering Committee (MSC) and the Interim Mimosa Planning Group (IMPG). The MSC coordinated mimosa control on Aboriginal land from 1991. It represented government, non-government and Aboriginal stakeholders. In 1996, the role of the MSC was expanded to include the national biological control effort. The IMPG was established in 1996 by the NT Minister for Primary Industry and Fisheries to identify and recommend a plan of action to protect the Northern Territory from the adverse effects of mimosa.

The MSC and the IMPG jointly identified the need for coordination of all mimosa research and control activities to ensure effective and efficient control of mimosa on all land tenures. The two committees were subsequently dissolved and replaced by the Mimosa Management Committee (MMC) which revised the 1997 strategy.

The MMC has representatives from NT DPIF (representing the NT Government), Parks Australia (also representing Environment Australia),

NLC, independent environmental consultant, Landholders, CSIRO, Agriculture WA, QDNR and Landcare.

A supporting Technical Working Group also includes operational program managers from CSIRO, DPIF, PWCNT, Parks Australia, NLC and Aboriginal and pastoral landowners.

During the development of this strategy, Government agencies, landholders and the general community were consulted and invited to comment on the discussion and consultation drafts.

The Mimosa Strategic Plan takes into account the recommendations from the Legislative Assembly of the Northern Territory Sessional Committee on the Environment's Report of Inquiry into Matters Relating to the Occurrence, Spread, Impact and Future Management of *Mimosa pigra* in the Northern Territory. This inquiry was instigated following a request by the NT Minister for Primary Industry and Fisheries.

NHT Weeds Program funds assisted in the preparation and publication of this Strategy.

## 2 STRATEGIC PLAN

### VISION

*Australia is protected from the adverse impacts of Mimosa pigra, and infested natural habitats and productive lands and waters are restored.*

Four integrated Programs will be implemented to achieve the vision of the Mimosa Strategy:

- Information and Education
- Prevention of Spread
- Research and Development
- Impact Reduction

The strategy recognises that, to be effective, the following organisations must work together in a cooperative and productive manner:

- CSIRO
- DPIF
- PWCNT
- Environment Australia
- Northern Land Council
- landholders (Aboriginal and non-Aboriginal)
- Government of Western Australia
- Government of Queensland
- Other relevant government and non government organisations

Whilst four separate programs are identified, they are complementary and interrelate in implementation of the strategy.

### 2.1 Information and education program

#### Desired outcome

Stakeholders are informed and educated about mimosa, its adverse impacts and appropriate land management strategies for its control.

#### Background

Target audiences will include relevant sections of the Aboriginal and non-Aboriginal communities, the agricultural and tourism industries and government and non-government organisations.

Key program issues to be communicated include:

- the identification of mimosa;
- relevant preventive land management methods;
- control methods including integrated control;
- control priorities;
- weed management planning; and revegetation options.

Educating the community about appropriate land management strategies to reduce the susceptibility of land to mimosa invasion and to prevent mimosa spread is vital to the success of this mimosa strategy. Aboriginal community-based training programs will need to be coordinated and adequately resourced to ensure the safe and effective control of mimosa.

Landholders will be encouraged to develop weed management plans on their properties, and to participate in training programs on mimosa recognition and methods for eradicating satellite outbreaks.

## Information and Education Program

Strategies	Key actions	Responsibility	Rank
<b>Foster effective communication with stakeholders</b>	<ul style="list-style-type: none"> <li>Consult with program staff to identify the relevant stakeholders groups</li> <li>Develop the 'mimosa messages' to be incorporated into communication programs, and match these with target audiences</li> <li>Develop and implement a communication program identifying the most appropriate methods for communicating the 'mimosa messages'</li> </ul>	DPIF/NLC DPIF/NLC/PWCNT  DPIF/NLC/PWCNT	1
<b>Develop community support for and understanding of mimosa issues</b>	<ul style="list-style-type: none"> <li>Review existing and previous information/education media and programs and assess their value to this program</li> </ul>	DPIF	2
<b>Develop and distribute information and education material for all stakeholders in the NT and along NT/Q and NT/WA borders</b>	<ul style="list-style-type: none"> <li>Develop and implement an awareness, communication and advice program targeted at inter-state border areas</li> <li>Provide training to ensure stakeholders can take part in relevant mimosa control programs</li> <li>Provide training to program staff to ensure effective delivery of this stakeholder training</li> <li>Ensure educational material prepared is prioritised and appropriate for the different stakeholder groups</li> <li>Use technical experts to provide material for educational packages, and communications experts for preparation of the material to be circulated</li> <li>Update educational material on a regular basis</li> <li>Prepare specific materials for schools and for politicians</li> </ul>	DPIF, WA and Q Govt's  DPIF/NTU DPIF/CSIRO/NTU DPIF DPIF  DPIF/NLC DPIF	2
<b>Support the other programs within this Strategy</b>	<ul style="list-style-type: none"> <li>Regularly evaluate and review the Information and Education Program.</li> <li>Facilitate effective information flow and collaboration between program staff</li> <li>Incorporate information from all control programs into the communication program</li> <li>Provide program staff with relevant feedback from the Program</li> </ul>	MMC MMC/MTWG All program leaders All program leaders  DPIF/CSIRO	1

### 2.2 Prevention of spread program

#### Desired outcome

To prevent mimosa from spreading to and impacting on new areas.

#### Background

The search for and eradication of satellite outbreaks of mimosa will have a major role in preventing spread of mimosa in Kakadu National Park, Arnhem Land, the Daly River Port Keats Land Trust (DRPKLT) (south of 14°S) and extremities of the weed's distribution (Appendix 1). It will also be critical to prevent spread across NT borders.

Aboriginal rangers and landholders will be trained, resourced and utilised for ground control of mimosa in a number of Aboriginal communities and outstations.

Many years of rigorous follow-up control will be an essential part of this work to prevent re-establishment of mimosa from the seed bank.

### 2.3 Research and development program

#### Desired outcome

To further develop the knowledge base and methods for effective and efficient management of mimosa, especially through application of integrated methods.

## Background

The Research and Development Program will ensure that the methods and strategies for controlling mimosa are the most efficient and effective possible. This program will also ensure that control methods cause minimal deleterious impact on the environment.

Biological control will potentially play a substantial role in reducing, for the long-term, the longevity, size and density of mimosa plants, and their rate of spread. The project builds on 17 years of intensive studies that have seen nine insects and two pathogenic fungi released. Further details of the control agents are provided in Appendix 2.

The synergy between various control options will be a research priority because it provides the basis for integrated control which has the potential to provide the most cost-effective long-term control of mimosa.

Research in support of the development of land management practices that reduce the likelihood of re-invasion of mimosa is an important component of mimosa management.

Any use of introduced species to assist revegetation will be guided by the principle described in the NT Weeds Management Strategy 1996–2005 that agencies must adopt ‘a responsible approach to the promotion of invasive species in those areas containing ecosystems which are sensitive to invasion’. There are many important wetlands, including many declared under the Ramsar Convention, within the potential range of mimosa in Australia.

Exotic plant species will not be recommended for revegetation on mimosa infected areas where they could spread to areas of conservation or cultural significance.

### Prevention of spread program

Strategies	Key actions	Responsibility	Rank
Prohibit propagation, cultivation and sale across Australia	<ul style="list-style-type: none"> <li>Declare mimosa to prohibit propagation, cultivation and sale in all States and Territories</li> </ul>	Legislative agency in each State and Territory	1
Establish protocols to prevent the spread of mimosa to adjoining states	<ul style="list-style-type: none"> <li>Prevent the interstate spread of mimosa from core areas in the NT</li> </ul>	DPIF, WA & Q Gov'ts	1
Carry out surveillance and eradication of satellite outbreaks of mimosa	<ul style="list-style-type: none"> <li>Identify and regularly survey border areas that are susceptible to mimosa invasion</li> <li>Initiate and resource community based Aboriginal land management programs in strategic locations.</li> <li>Ground control crews with aerial support will search for and control satellite outbreaks. They will establish and maintain records of all control efforts and provide the information to a central register.</li> </ul>	DPIF, landholders WA & Q Gov'ts NLC, DPIF, ILC  Landholders DPIF, PWCNT, Parks Australia, PAWA, WA & Q Gov'ts	1
Reduce the transport and dispersal of mimosa seeds to new areas	<ul style="list-style-type: none"> <li>Ensure that livestock from infested areas are held in quarantine or cleaning areas.</li> <li>Maintain roadsides free of mimosa.</li> </ul>	Landholders, DPIF, Parks Australia, Pastoralists T&W, DPIF,	1
Implement land management strategies that decrease the susceptibility of land to mimosa invasion	<ul style="list-style-type: none"> <li>Liase with land managers and owners to implement the results of research, and to develop mimosa surveillance plans in areas of high risk.</li> <li>Present the case for recognising mimosa as a key threatening process under the <i>Endangered Species Protection Act 1992</i></li> </ul>	DPIF, CSIRO, NLC  CSIRO, PWCNT	1
Encourage all State and Territory Governments to recognise mimosa under their noxious weed legislation	<ul style="list-style-type: none"> <li>Liase with and provide information to all State and Territory Governments regarding the national threat of mimosa.</li> <li>Include mimosa in routine national monitoring and surveillance programs.</li> <li>Control and record locations of mimosa.</li> </ul>	DPIF, CSIRO, PWCNT  DPIF, PWCNT, DLPE, Landholders, WA & Q Gov'ts DPIF	1

## Research and Development Program

Strategies	Key actions	Responsibility	Rank
<b>Mimosa Ecology</b> <ul style="list-style-type: none"> <li>To better understand the ecology of mimosa and susceptible habitats</li> </ul>	Conduct relevant studies and supply peer reviewed information on: <ul style="list-style-type: none"> <li>the population dynamics of mimosa, causes of invasiveness, and efficiency of control methods;</li> <li>the factors that limit mimosa's distribution, habitats at risk and methods to achieve maximum control; and</li> <li>the modes of dispersal, distinguishing between natural and human vectors, enabling the set-up of preventive control programs.</li> </ul>	CSIRO,DPIF  CSIRO,DPIF  CSIRO,DPIF	1
<b>Biological Control</b> <ul style="list-style-type: none"> <li>Provide remaining potential biological control agents and supporting information to an Australian quarantine facility</li> <li>Establish control agents widely across mimosa's range</li> <li>Optimise the efficacy of biological control agents</li> </ul>	<ul style="list-style-type: none"> <li>Collect and study populations of potential biological control agents from mimosa's native range</li> <li>Freight the most promising agents to a quarantine facility in Australia for biological study and host testing</li> <li>Develop a mass rearing and distribution program that maximises the establishment over the geographical range of mimosa</li> <li>Develop a strategy for implementing biological control with landowners and managers</li> <li>Conduct experiments to measure the impacts of biological control agents</li> <li>Develop a methodology to optimise the efficacy of biological control</li> </ul>	CSIRO  CSIRO  DPIF,CSIRO  DPIF,CSIRO  DPIF,CSIRO	1
<b>Integrated Control</b> <ul style="list-style-type: none"> <li>Further develop herbicidal, mechanical and other non-biological control methods</li> <li>Quantify the impact on mimosa of integrated control</li> <li>Provide recommendations for strategic integration of the available control options</li> </ul>	<ul style="list-style-type: none"> <li>Continually update methodologies to ensure that effective control with minimal environmental risk is achieved</li> <li>Conduct experiments to quantify the synergism between control options including biological control</li> <li>Develop control protocols for different regions based on the known requirements of land managers and a knowledge of the impact of control methods</li> <li>Undertake risk assessment and determine ecological impacts of control methods to provide information about sustainable control with minimal environmental risks</li> </ul>	DPIF  CSIRO, DPIF  CSIRO, DPIF  ERISS	1
<b>Sustainable Land Management</b> <ul style="list-style-type: none"> <li>Develop methods for restoring habitats invaded by mimosa</li> <li>Develop and encourage land management practices that prevent mimosa invasion and re-establishment</li> </ul>	<ul style="list-style-type: none"> <li>Conduct research into native understorey species for revegetation of areas reclaimed from mimosa, and develop protocols for revegetation</li> <li>Conduct surveys of habitat types, land condition and land use in areas susceptible to mimosa invasion and use as a predictive tool for land management.</li> </ul>	DPIF, GANT  DLPE, PWCNT, DPIF	1

## 2.4 Impact reduction program

### Desired outcome

To reduce the current adverse impacts of mimosa infestations.

### Background

The Impact Reduction Program will focus on those catchments where large stands of mimosa currently occur. These include the Oenpelli floodplain and the catchments of the Mary, Adelaide, Finnis, Reynolds and Daly Rivers. Many of these floodplains are multiple-use areas, being important for nature conservation, tourism, recreation, Aboriginal use and agriculture. Reducing the impact of mimosa (and other exotic species) is important to sustain these uses.

### Weed Ecology

- upper catchments have higher priority than lower catchments because mimosa seeds can spread downstream with water flow;

- smaller infestations have a higher priority than larger, because they are more easily controlled, but can expand rapidly;
- advancing infestations have a higher priority than static infestations;
- roads, tracks and fence lines have a high priority because of the potential for seed to be carried by vehicles

### Land Use

- areas of Aboriginal cultural significance have a high priority;
- areas of high conservation value have a high priority;
- areas of high value to industry have a high priority

Various proposals have been put forward for commercial utilisation of mimosa. Should any of these prove to be economically viable, the MMC will seek to incorporate such utilisation within the goals of this Strategy.

### Impact Reduction Program

Strategies	Key actions	Responsibility	Rank
Reduce the incidence and adverse impacts of mimosa on biological diversity, Aboriginal use, pastoralism, tourism, fisheries and other industries and pursuits	<ul style="list-style-type: none"> <li>• Establish catchment management groups for mimosa affected catchments</li> <li>• Map the infestations within each river catchment</li> <li>• Develop and implement catchment management plans establishing priorities for control areas and activities</li> <li>• Ensure that control activities make use of the most up to date developments resulting from the Research and Development Program</li> <li>• Evaluate proposals for commercial use of mimosa according to the goals of this Strategy</li> </ul>	DPIF, DLPE, Landholders, NLC DPIF, PWCNT, Landholders DPIF, NLC, PWCNT, Landholders, DLPE DPIF MMC, DPIF, CSIRO	1
Continue control of the large infestation in western Arnhem Land	<ul style="list-style-type: none"> <li>• Ground control crews with limited aerial support to treat remaining mimosa outbreaks</li> </ul>	Kunbarllanjnja, DPIF, NLC	1

### Land Management Responsibilities for Mimosa Control

	Arnhem Land	Mary River	Adelaide River	Darwin and environs	Finniss/ Reynolds Rivers	Daly River
Aboriginal Landowners & Northern Land Council	✓			✓	✓	✓
Pastoral leaseholders		✓	✓	✓	✓	✓
PWCNT		✓	✓	✓	✓	✓
Local Gov't	✓		✓	✓		✓
Private land owners			✓	✓		
Other organisations (eg PAWA, ADF, NGO's)		✓		✓		

### 3 MONITORING AND EVALUATION

The Mimosa Strategic Plan will be reviewed after five years. The strategy will also be monitored and evaluated on a regular basis by the Mimosa Management Committee. This will include critical evaluation of reports on actions undertaken by responsible agencies and landholders under both the

Mimosa Strategy and the Mimosa Management Plan.

The four management programs will be evaluated against a set of performance indicators listed in the table below.

<b>Performance indicator</b>	<b>Management program</b>
Increased community awareness of the impact of mimosa, and the programs aimed at its management.	Information and education; Impact Reduction
Improved methods for effective and efficient management of mimosa	Impact reduction; Prevention of Spread; Research and development
Improved knowledge of mimosa management by landholders and the integration of control practices, as determined by Weeds Officers.	Information and education; Impact Reduction
Increased landholder activity on mimosa management, as ascertained by use of the subsidy schemes, and from monitoring by Weeds Officers.	Information and education; Impact Reduction
Development of mimosa management plans for specific catchments.	Information and education ; Prevention of spread; Impact Reduction
Return of infested areas to productive use or as a conservation resource.	Prevention of spread; Research and development; Impact Reduction
Improved survey capability for satellite infestations.	Prevention of spread; Research and development; Impact Reduction
Eradication of satellite infestations.	Information and education; Impact Reduction; Prevention of spread; Research and development; Impact Reduction
Containment of mimosa to its present distribution in the Northern Territory, or preferably reduction in the area of distribution.	Information and education; Impact Reduction; Prevention of spread; Research and development; Impact Reduction
Prevention of spread of mimosa to the States of Australia.	Information and education; Prevention of spread; Research and Development

## 4 STAKEHOLDER ROLES AND RESPONSIBILITIES

### Private landholders

#### Prevention of spread

- Record locations of mimosa
- Eradicate satellite outbreaks
- Hold livestock from infested areas in quarantine

#### Reduce the impact of mimosa

- Participate in catchment management groups
- Implement catchment management plans

### Land Councils

#### Prevention of spread

- Assist in the control of the infestations on Aboriginal land
- Assist in the development and implementation of land management programs in Aboriginal communities

### NT Government

#### Information and education

- Facilitate effective communication between stakeholders
- Liaise with landholders, community and government departments
- Develop community understanding of mimosa issues
- Develop and distribute education material

#### Prevention of spread

- Eradicate satellite outbreaks
- Assist Aboriginal communities to develop land management programs
- Implement land management practices that reduce risk of mimosa invasion
- Keep roadsides free of mimosa

### NT, WA and Q Governments

#### Information and education

- Implement an education program targeted at inter-state borders

#### Prevention of spread

- Establish protocols to prevent the spread of mimosa from the NT
- Prohibit propagation, cultivation and control
- Declare mimosa in all States and Territories
- Regularly survey susceptible border areas and eradicate outbreaks
- Maintain of record of outbreaks and control efforts on a central register

### NT Government and Commonwealth Government

#### Research and development

- Conduct studies on mimosa ecology including population dynamics, modes of dispersal
- Continue research on biological control including measuring impacts
- Examine the synergism between control options
- Undertake risk assessment and determine ecological impacts of control methods
- Investigate appropriate native understorey species for revegetation
- Research the use of habitat susceptibility as a predictive tool for land management

#### Prevention of spread

- Prevent the case for recognising mimosa as a key threatening process under the *Endangered Species Protection Act 1992*
- Provide information to all State and Territory Governments about the national threat of mimosa.

### Federal government departments and corporations

- Ensure quarantine controls on entry of mimosa (AQIS)
- To ensure uptake by Departmental staff to restrict movement of weeds (agencies that manage land and travel on non-government land)

- To ensure mimosa control is undertaken on all federally managed lands (Defence, Environment Australia and other Commonwealth departments/corporations that manage land)
- Oversee and manage federal funds including Natural Heritage Trust and National Weed Program (Environment Australia, Agriculture, Forestry and Fisheries – Australia).

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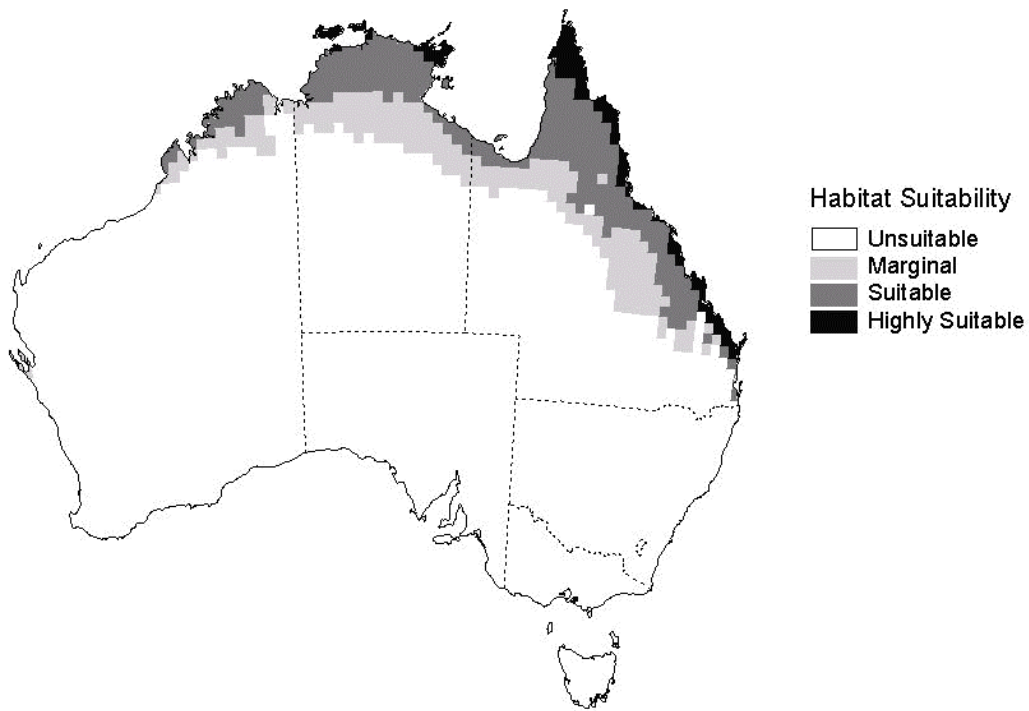
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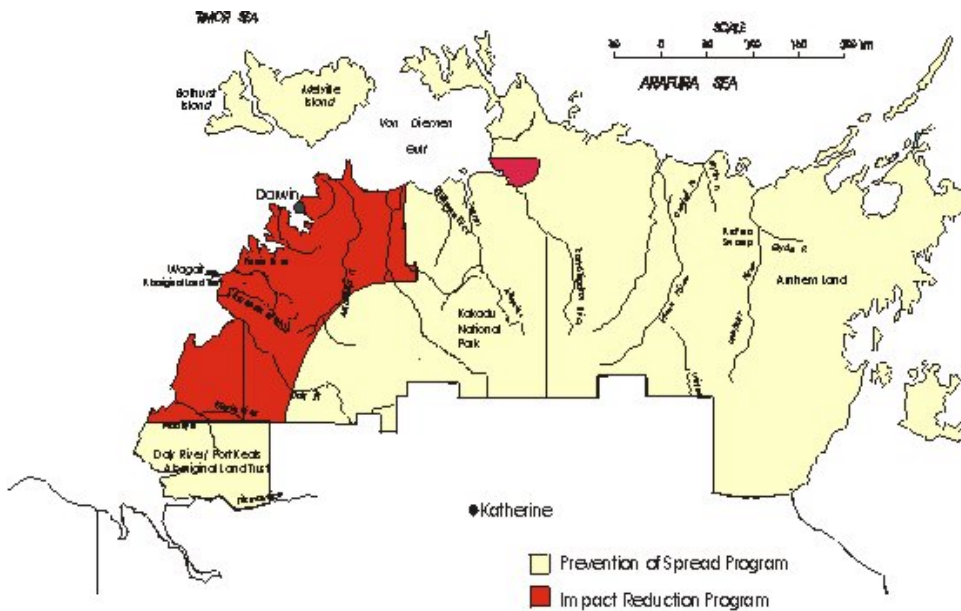
## 6 GLOSSARY

<b>ACT</b>	Australian Capital Territory
<b>ADF</b>	Australian Defence Force
<b>Agriculture WA</b>	Department of Agriculture, Western Australia
<b>AQIS</b>	Australian Quarantine and Inspection Service
<b>CRC</b>	Cooperative Research Centre for Sustainable Development of Tropical Savannas
<b>CSIRO</b>	Commonwealth Scientific and Industrial Research Organisation
<b>DLPE</b>	Department of Lands, Planning and Environment
<b>DPIF</b>	Northern Territory Department of Primary Industry and Fisheries
<b>DRPKLT</b>	Daly River Port Keats Land Trust
<b>Environment Australia</b>	formerly known as Australian Nature Conservation Agency
<b>ERISS</b>	Environmental Research Institute of the Supervising Scientist
<b>GANT</b>	Greening Australia Northern Territory
<b>IMPG</b>	Interim Mimosa Planning Group
<b>Kunbarllanjja</b>	formerly Gunbalanya (Oenpelli)
<b>MMC</b>	Mimosa Management Committee
<b>MSC</b>	Mimosa Steering Committee
<b>NGO</b>	Non-Government Organisation
<b>NHT</b>	National Heritage Trust
<b>NLC</b>	Northern Land Council
<b>NT</b>	Northern Territory
<b>Parks Australia</b>	part of the Biodiversity Group of Environment Australia (formerly known as Australian Nature Conservation Agency)
<b>PAWA</b>	Power and Water Authority NT
<b>PWCNT</b>	Parks and Wildlife Commission of the Northern Territory
<b>QDNR</b>	Queensland Department of Natural Resources
<b>Q</b>	Queensland
<b>Ramsar Convention</b>	The Convention on Wetlands of International Importance, especially as Waterfowl Habitats
<b>WA</b>	Western Australia
<b>WONS</b>	Weeds of National Significance

## 7 APPENDIX 1 Mimosa maps



Potential distribution of *Mimosa pigra* (D. J. Kriticos, CSIRO, unpublished).



Areas currently under the Prevention of Spread and Impact Reduction Programs

## 8 APPENDIX 2 The Status of Biological Control Agents (to May 2000)

Biological Control Agent	Plant part damaged	Release date	Status
<b>INSECTS</b>			
<b>Bruchids</b>			
<i>Acanthoscelides quadridentatus</i>	mature hard seeds	Apr 1983	established, little impact
<i>Acanthoscelides puniceus</i>	mature hard seeds	Apr 1983	established, little impact
<b>8.1.1.1 Apionids</b>			
<i>Coelocephalapion aculeatum</i>	flower-buds	Jan 1992	established
<i>Coelocephalapion pigrae</i>	leaves and flower-buds	May 1994	established and impacting on seed production
<b>Weevils</b>			
<i>Chalcodermus serripes</i>	mature green seeds	Apr 1996	too early to assess
<i>Sibinia fastigiata</i>	immature green seeds	Dec 1997	too early to assess
<i>Sibinia seminicola</i>	immature green seeds	–	under study in Mexico
<b>Leaf beetles</b>			
<i>Chlamisus mimosae</i>	leaves, stems	Nov 1985	fluctuating populations, little impact
<i>Genaphthona transversicollis</i>	adults on leaves, larvae on roots leaves and stems	–	under study in quarantine
<i>Malacorhinus irregularis</i>	young stems	–	Expected release Oct 2000
<b>Moths</b>			
<i>Neurostrota gunniella</i>	young and old stems	Feb 1989	abundant and widespread; damages leaf and seed production
<i>Carmenta mimosa</i>	leaves (leaf tiers)	Jul 1989	established, spreading: early signs of causing substantial damage
<i>Apotoforma</i> sp.	leaves (leaf tiers)	–	in quarantine
<i>Aristotelia</i> sp.	leaves (leaf tiers)	–	in quarantine
<i>Pococera</i> sp.	Pods and leaves	–	in quarantine
<i>Ithome</i> sp.	stems	–	under study in Mexico
<i>Morpheis pyracmon</i>	leaves	–	application for import to quarantine
Species of Geometridae (loopers)	leaves	–	to be studied in Mexico
<b>Leaf hoppers</b>			
Cicadellidae	leaves and young stems	–	to be studied
<b>PATHOGENS</b>			
<i>Diabole cubensis</i> (fungus)	leaves and stems	Mar 1996	too early to assess
<i>Phloeospora mimosae-pigrae</i> (fungus)		Mar 1995	too early to assess