WEEDS OF NATIONAL SIGNIFICANCE

ATHEL PINE

(*Tamarix aphylla*)

Strategic Plan

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Supporting information about the National Weeds Strategy, Weeds of National Significance and progress to date may be found at www.weeds.org.au where links and downloads provide contact details for all species, their management committees and copies of the strategy.

This strategy was developed under the leadership of the Dept of Primary Industry & 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

Athel pine (*Tamarix aphylla*) is an invasive tree capable of both seed and vegetative reproduction while surviving in very harsh environmental conditions. It greatly alters natural systems, affecting vegetation, fauna and the physical environment leading to dramatic ecological change. The unique habitat of Australian river systems is threatened by this species with the Finke River in Central Australia, believed to be the oldest river system in the world, fully blocked in places by athel pine.

In addition to its environmental impact, athel pine currently impacts on pastoral operations, community lifestyles and potentially the tourism industry.

Athel pine currently infests the Finke River in the NT, ephemeral creeks in Far Western N.S.W., Starvation Lake and Tilcha Flow (a stream flowing from Tilcha Bore) in SA, the lower Gascoyne and Avon Rivers in WA and scattered plants occur over parts of the Burnett region and Darling Downs in QLD. These infestations are supplemented by extensive occurrences within home gardens on stations and in communities and towns. Currently this species only occurs across a small fraction of its potential distribution within Australia.

The strategy outlines a number of actions designed to prevent further infestations and to minimise the impact current infestations have on industry and the environment. A key step in this process is to recognise that this issue stretches across borders and requires a national approach to provide successful and integrated management.

The vision of the strategy is:

Protecting Australia's biodiversity, landscape and industries from athel pine (*Tamarix aphylla*).

The strategy aims to deliver four desired outcomes:

1 The prevention of new infestations of athel pine.

- Assess weed potential of other *Tamarix* spp
- Ban the sale and trade of weedy *Tamarix* spp
- Assess where *Tamarix* spp may invade
- Increase public awareness of *Tamarix* spp and their impacts
- Monitor for new *Tamarix* spp invasions
- Clean areas to be protected from an invasion event.
- Quantify the benefits to stakeholders, including governments, land holders, other land managers and the community of the worth of *Tamarix* spp management

2 The eradication of all athel pine occurrences in riparian zones.

- Survey and map all *Tamarix* spp occurrences in riparian zones
- Investigate and disseminate appropriate control methods
- Undertake a strategic control plan
- Implement control program

3 The management of athel pine in non riparian areas.

- Identify priority areas and management options
- Manage high priority infestations

4 The coordination of strategic athel pine management nationally.

- Coordinate the implementation of the strategy
- Monitor and evaluate the implementation of the strategy

THE CHALLENGE

Athel pine has impacted severely on riparian areas in the Southern region of the Northern Territory, particularly within the Finke River Catchment and has demonstrated potential to spread rapidly into other catchments in South Australia, Western Australia, New South Wales and Queensland. Athel pine is found in many states and territories in situations where infestations can lead to spread into adjoining states therefore creating the need for national coordination.

Athel pine grows rapidly and can be very invasive. It has a high water use characteristic and can out compete and displace native vegetation, significantly altering the flora and fauna habitat. Once established, athel pine is very difficult and costly to control with early detection and management an essential component of effective control.

The isolation of many outbreaks and occurrences increases the difficulty of managing this species, however a range of control methods is available. Infestations are generally restricted to watercourses and this gives a restricted area of control for current infestations.

The challenge is to prevent further infestations of athel pine into clean catchments by managing and reducing current occurrences in home gardens while controlling with the aim of eradicating all current infestations in riverine environments. Implementation of the actions outlined in this strategy will result in the reduced impact of athel pine in Australia.

1 BACKGROUND

Athel pine is a member of the Tamaricaceae family. This family comprises 4 genera and about 100 species of shrubs and small trees, all with thickened scale-like leaves. The taxonomy is difficult and confused, leading to errors in classification. However as a number of species have shown weedy tendencies both in Australia and overseas it is both acceptable and preferable to address all species.

None of the species are native to Australia. Athel pine is the only member of the family to be a declared weed in Australia. However, a number of species are declared worldwide. *Tamarix petandra* and *Tamarix ramosissima* (both commonly known as Tamarisk) and *Tamarix parviflora* (smallflower tamarisk) are planted in Australia as ornamentals. While athel pine (*Tamarix aphylla*) is the largest problem in Australia, tamarisk (*Tamarix ramosissima*) has shown weedy tendencies in both N.S.W. and WA. *Tamarix* spp. are a very extensive problem in many parts of America, having invaded over 500 000 hectares in the western U.S. (DeLoach, 1988). This has caused significant damage and highlights the possibility of other *Tamarix* species being a potential invader of streams and marshes in Australia.

1.1 Biology

Parsons and Cuthbertson (1992) describe athel pine as a spreading tree to 10 metres high with pendulous, jointed branches. It is not a true pine but is a flowering plant. The trunks of mature trees have a thick, rough, dark grey to black bark and grey-brown stems. Immature trees have light grey trunks and stems. The basal diameter of mature trees can exceed 40cm. The trees have a strong woody rootstock with an extensive network of deeply penetrating and spreading roots.

The minute leaves of athel pine are a dull grey-green and form a sheath around the fine branchlets, giving them the appearance of pine needles. The flowers are pinkish-white, small and without stalks. They occur in spikes 3 to 4 cm long growing at the ends of the previous year's branches. The fruit is bell shaped, capped with a hairy tuft and contains numerous seeds. The seeds are very small, cylindrical and crowned with a tuft of fine hairs making them easily transported by wind. Despite this, vegetative reproduction from broken branches is more common as it is believed the seeds are only viable for a very short period of time (Zohary 1956, Waisel 1960).

Seeds germinate most of the year provided moisture is available, with the main germination period being autumn. Seedlings establish readily on saline and alkaline soils and can reach a height 60 to 100 cm in the first year. Subsequent growth is also rapid with trees increasing in height between 2 – 5 metres a year under favorable conditions (Parsons & Cuthbertson, 1992). The deeply penetrating roots of athel pine utilise large volumes of soil moisture when available. It can tolerate saline water and exudes large quantities of salt through the leaves, salting the surrounding soil. On moist soil it establishes and grows readily from seed or vegetative parts.

1.2 History of Spread

The introduction and promotion of athel pine as a useful tree throughout arid and semi-arid Australia led to plantings in the 1930's and 40's in Broken Hill and Whyalla. These plantings were soon followed in the 1940's and 50's by plantings in other states as wind and sun shelter species at homesteads, communities, bores and other areas. Plantings in the NT led to an extensive infestation developing along the Finke River system. This seems to have occurred primarily because of extensive flood events in the 1970's and 1980's resulting in 600 kilometres of streambeds being affected. This rapid dispersal after a long dormancy period may have been assisted by the ability to influence local environmental characteristics particularly soil salt levels, which give it a large competitive advantage over less salt tolerant native species.

Infestations have since been found in other states with a large infestation being found at Starvation Lake in 1990, the lower Gascoyne River in 1991 and the most recent being at Blackwater during 1999. These outbreaks show the range over which this species is now found.

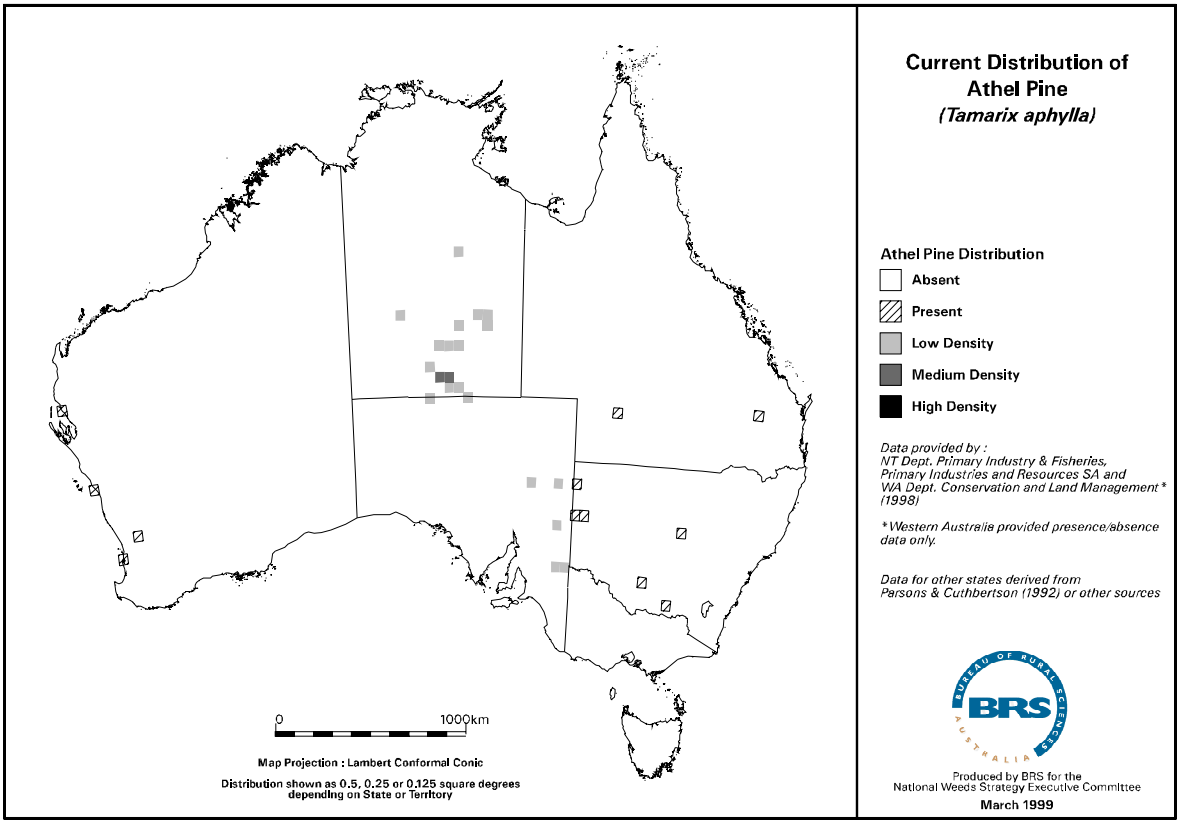

Figure 1. Current distribution of athel pine.

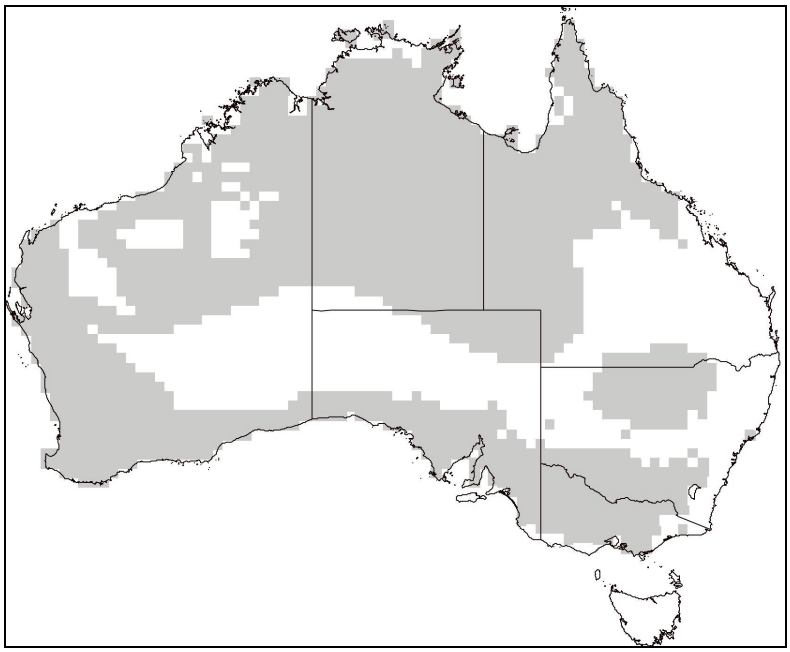

Figure 2. The area of Australia where CLIMATE modelling predicts that athel pine could become a serious weed. This distribution was generated without using rainfall as a limiting factor to growth, because the tree is capable of establishing in ephemeral watercourses where subsurface water is available, enabling the tree to survive for long periods in these situations (Randall, 2000). The areas under greatest threat are watercourses within the shaded area.

1.3 Summary of Impacts

Athel pine causes severe environmental damage and impacts economically on the pastoral industries of central Australia. The potential to effect the aesthetics and tourism experience of areas of natural heritage has significant ramifications for the tourism industry. It threatens heritage buildings by disrupting foundations and walls, as well as threatening areas of natural significance such as Finke Gorge National Park, Lake Eyre and the Gascoyne and Pilbara regions of WA.

Athel pine displaces Eucalypts and other native vegetation with fewer native herbs

persisting in areas of thick athel pine. This results in a change in the undergrowth to a relatively small number of salt tolerant chenopods and grasses. In addition, there is a reduction in the number of birds and reptiles in the immediate area when athel pine replaces the native vegetation. The replacement of native vegetation may also alter the fire regime of an area as athel pine does not burn well and hence suppresses the natural tendency of fire to provide the trigger for regeneration of the native vegetation.

The changes in flora and fauna are a result of the ability of athel pine to change the physical environment. The excretion of salt through the leaves of athel pine leads to the high salinity levels found in the dense compacted litter beneath the trees and the loss of habitat in the understorey (Griffin et al 1989). Another factor to be considered is the loss of nesting sites due to athel pine branches not decomposing to form nesting hollows when dead. Athel pine is drought resistant and varies its water use dependent upon water availability. It is responsible for lowering water tables, thus draining waterholes and depriving native flora and fauna of accessible water.

Dense athel pine increases sedimentation rates by trapping and stabilising sediment during river flows. This along with very dense infestations can cause redirection of flows leading to increased overland flooding and localised bank erosion.

Athel pine is a major pest of the pastoral industry in Central Australia due to wide ranging impacts. Dense infestations cause increased difficulty and therefore increased expense during mustering operations, along with pasture production decreases. The ability to utilise available water resources dries up waterholes, reducing the number of stock watering points. The result is increased management pressures accompanied by reduced carrying capacity within infested areas.

Separate to the economic impacts on the pastoral industry is the impact on the tourism industry. The aesthetic value of rivers and creeks is a valuable tourist attraction in Central Australia and although this is much more difficult to quantify athel pine certainly has the potential to impact on this industry. The aesthetic quality of the waterways and the quality of the tourist experience are degraded as athel pine takes over from the characteristic open river beds with native riverine vegetation of Eucalyptus and understorey plants.

1.4 History of Research and Management

As a result of the study by Griffin (1989), athel pine was declared a noxious weed under the Northern Territory Noxious Weeds Act (1962) in 1988.

In 1989 NT DPIF staff began the process of screening trials to determine the efficacy and suitability of various herbicides and application techniques. These trials included stem injection and basal bark techniques using a range of products and product concentrations. The results of these trials were that stem injection with any one of the following concentrated products of 2,4-D ester, triclopyr, fluroxypyr, 2,4-D amine plus picloram and triclopyr plus picloram gave 100 % kills. Basal bark treatments of fluroxypyr and triclopyr mixed with diesel at 1:50 gave in excess of 80 % kills (White & Gracie, 1990).

In March 1994 mechanical control trials were initiated at Horseshoe Bend Station with a D5 bulldozer and 3 m blade plough. The success of the initial mechanical control work prompted the purchase of a D8 bulldozer and 4 m blade-plough by the manager of Horseshoe Bend station in 1995. In 1996 approximately 25 km of the Finke River densely infested with athel pine was treated using this machinery, with good results. Approximately 10 - 20 % of mature trees survived initial treatment using this method and follow-up treatment utilising chemical and mechanical treatment of the scattered re-growth, was required.

Initial control was opportunistic and limited being restricted by funding and the level of management knowledge at the time. This led to increased re-growth as areas upstream provided fresh seed and vegetative material into the ‘cleared’ areas. A more strategic approach was then developed based on past experience and new knowledge, with control commencing in the upper reaches of the Finke with major control from Glen Helen Gorge to the Stuart Highway (approx. 130 km) achieved by 1996. Work continues with

mechanical and chemical control of re-growth, seedling growth and mature seed producing trees. This is being coordinated to obtain maximum strategic benefit from past expenditure. Since 1997 control has occurred from the Stuart Highway to Horseshoe Bend Station. (approx. 260 km further) with follow up spraying continuing along the length of the river where major control has occurred.

Apart from the work in the N.T, work has been carried out in WA since 1993 to control athel pine on the Gascoyne River near Carnarvon. This involves treating seedlings by hand pulling or with Tordon herbicide when too large to pull, however the large reproducing trees have not been controlled. A control program has also been implemented for *Tamarix ramosissima* at Toodyay involving using a backhoe to physically remove large clumps of trees. Plants have been hand pulled and treated with Tordon at Blackwater in QLD and trees have been mechanically removed from a number of western NSW towns over the past decade.

Tamarix aphylla is not a declared plant in Western Australia

1.5 Control Methods

Several control options are available for athel pine. The most efficient option is dependent on the age, structure, location, density and growth habit of the tree. Athel pine often grows in clumps, particularly the young and juvenile trees. These are then pushed over by floodwaters and vertical branches shoot from the horizontal stems. When the horizontal stem is covered by sand and debris it gives the impression that the vertical branches are separate stems or trees. This makes control very difficult and follow up control essential. In dense infestations 100 % control is rarely achieved in the first instance. Further research on the biology of athel pine and the effectiveness of various techniques and herbicides will increase the effectiveness of control measures, while limiting off target damage.

Chemical

There is a range of chemical control options suitable for athel pine in the riverine situation. However as with all herbicide application, care needs to be taken not to cause off target damage and the fragility of the riverine environment needs to be considered. Another factor is the push by industry, producers and consumers for clean / green product and processes. These factors determine the herbicide used and the manner in which it's use is managed.

Stem injection can be used on individual single stem or accessible multi-stemmed trees. Injection points need to be no further than 100 mm apart, as athel pine does not translocate herbicide laterally.

Cut stump application is suitable for large trees. Care must be taken to ensure all stems are treated immediately following cutting and that the fallen trees are not left in moist soil, the creek or riverbed, where they may strike.

Basal bark application is suited to immature and juvenile trees that have not developed a hard rough bark. Coverage to the root crown is essential, though this may be difficult where sand and debris has built up around the base of the tree.

Foliar application of herbicide is most practicable for seedlings and young trees up to two metres tall.

Physical

Bulldozing can be used to remove either individual trees or large infestations. For the most effective control, care needs to be taken to remove the majority of the root system. Care must also be taken to reduce the amount of sand that covers the uprooted and felled stems and roots as they may re-shoot.

Blade ploughing is suited to large infestations of seedlings however, previous work has demonstrated an importance in cutting the plant well below the root crown and the cut surface is well covered with sand or soil.

Mature trees can be removed with a chainsaw however they will re-shoot unless they are treated with herbicide at the same time.

Biological

The United States Department of Agriculture has investigated the prospects for biological control of various *Tamarix* species. Athel pine was not the target of this research and there

is no known bio-control agent for athel pine in Australia. However, it should remain as an option for the future, with international cooperation investigated.

1.6 Socioeconomic Factors

When trees are impacting on buildings and infrastructure the costs are easily quantified however, the high cost of control is an obstacle in other situations. When this cost is compared to the economic losses due to this species, control is difficult to justify, however the environmental cost must also be considered. The long term vigilance and follow up, which is needed to control this species, will add to the cost of control greatly. The total management cost in relation to property income means the cost of control over extensive areas may be beyond the resources of individual landowners / managers. Due to the remote location of many athel pine infestations, raising awareness is difficult. Large distances between infestations and population centres result in high costs and difficulties in transporting herbicide and control equipment. The perception and use of athel pine as a shade tree is still quite common, particularly in communities and town areas. This perception needs to be changed to achieve greater cooperation for undertaking control measures. This issue is compounded by the possible heritage value of some of the earlier athel pine plantings in Australia and this aspect must be addressed in a positive manner.

1.7 Principles underpinning the Plan

The strategic plan is 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 National athel pine Weed Management Strategy has been established to provide a framework for coordinated management of the weed across the country. To date occurrences are limited to Central Australia, the Gascoyne and Avon Rivers in Western Australia and scattered occurrences throughout South Australia, Queensland and New South Wales. The strategy is linked to other national and state resource plans as detailed below.

Scope Scale	Natural Resource Management	Pest Management	Weed Species Management
National	National Strategy for the Conservation of Australia's Biological Diversity National Strategy for Ecologically Sustainable Development	National Weeds Strategy	Athel pine WONS Strategy
State		Queensland Weed Strategy Northern Territory Weed Management Strategy New South Wales Weeds Strategy Weed Plan for Western Australia (Draft) South Australian Weeds Strategy	Northern Territory Athel pine Strategy (draft).
Regional	Regional NRM Plans		
Catchment	Catchment Management Strategies		Athel pine control in the Finke River Project
Local	Landcare and Roadside Conservation Plans Road, rail and utility corridor management plans	Local Government Pest Management Plans (Q.)	
Property	Property Management Plans	Property Pest Management Plans	

2 STRATEGIC PLAN

VISION

Protecting Australia's biodiversity, landscape and industries from athel pine (Tamarix aphylla).

To ensure that weeds of national significance are effectively managed the National Weeds Strategy outlines the need for the development, implementation and evaluation of a management program for each species.

2.1 The prevention of new infestations of athel pine.

The potential distribution for athel pine infestations is much greater than the distribution where outbreaks currently occur. When combined with the high cost of control once outbreaks have occurred, the prevention of outbreaks becomes vital for effective management. The objectives outlined below are aimed at preventing new infestations of athel pine and they provide the framework for achieving this. Increasing awareness of the threat this species poses is integral to this process and is closely linked to carrying out risk assessment for areas that may be under threat and also for other *Tamarix* spp. Developing an incursion response plan will also increase the ability to prevent invasions in new areas.

Strategy	Actions	Responsibility	Rank
2.1.1 Assess weed potential of other *Tamarix* spp	Risk assessment of all *Tamarix* spp.	All state and territory governments. AQIS	2
2.1.2 Implement legislative mechanisms to control *Tamarix* spp.	Proclaim / declare all weedy *Tamarix* spp. in all states and territories. Enforce restrictions as appropriate for declared species.	All state and territory governments. Australian Weeds Committee	1 3
2.1.3 Assess where *Tamarix* spp. May invade.	Develop risk map for *Tamarix* spp invasion in Australia.	Management Committee	1
2.1.4 Increase public awareness of *Tamarix* spp. and their impacts.	Develop posters, brochures etc. Hold field days, radio and print media publicity and promotion. Support Nursery Industries initiatives on *Tamarix* spp.	All state and territory governments. Management committee All state and territory governments, Animal and Plant Control Boards, Management committee Animal and plant control bodies. Soil conservation bodies. Councils etc.	1 2 2
2.1.5 To monitor for new *Tamarix* spp. invasions.	Develop cost effective monitoring / survey programs commensurate with the level of risk.	All state and territory governments. Local Authorities	1
2.1.6 Clean areas to be protected from an invasion event.	Put management program into place. Develop an invasion response plan. Develop and implement revegetation strategies for eradication zones.	All state and territory governments. Local Authorities Management Committee All state and territory governments. Management Committee Management Committee	1 1 2
2.1.7 Quantify the benefits to stakeholders, including governments, land holders, other land managers and the community of the worth of *Tamarix* spp. management.	Undertake cost / benefit analysis of control programs.	Management Committee	3

2.2 The eradication of all athel pine occurrences in riparian zones.

Due to the ability of athel pine to spread vegetatively and its preference for watercourses, riparian zones are at greatest risk from invasion. For this reason, occurrences in these areas are treated differently to other occurrences. Recognising the need to eradicate athel pine from riparian areas stresses the importance of effectively managing these areas.

Strategy	Actions	Responsibility	Rank
2.2.1 Survey and map all *Tamarix* spp. occurrences in riparian zones.	Determine mapping priority including methodology, scale and location of mapping.	Local Authorities. All state and territory governments.	1
	Carry out the surveying and mapping.	Local Authorities	2
	Develop protocol for ongoing surveys.	All state and territory governments.	3
2.2.2 Investigate and disseminate appropriate control methods.	Refine control methods	All state and territory governments. Management committee	1
	Publish a best practice manual / control guide.	All state and territory governments. Management committee	2
	Carry out an appraisal of biological control options	Management committee.	3
2.2.3 Undertake a strategic control plan.	Prioritise outbreaks to be controlled.	All state and territory governments local authorities. and community	1
	Allocate resources.	All state and territory	1
	Implement a procedure for receiving and responding to reports of occurrences.	governments and community	2
	Follow procedure.		3
	Monitor and review.		3
2.2.4 Implement control program.	Carry out control as indicated in the strategic control action plan.	All state and territory governments,	1
	Implement practices to rehabilitate affected areas.	landholders,	2
	Review effectiveness.	community, land managers, landcare groups.	3

2.3 The management of athel pine in non-riparian areas.

The threat posed by non-riparian occurrences depends greatly on the physical position of individuals and the areas they may be threatening. Non riparian occurrences may provide fresh material for new outbreaks and may impact on heritage buildings or areas of significance away from riparian areas.

For this reason management options and priority areas need to be established for these occurrences and the varying impacts they may have are recognised by placing varying importance on these individuals.

Strategy	Actions	Responsibility	Rank
2.3.1 Identify priority areas and management options.	Identify and survey for significant plants adjacent to eradication zones. Prioritise areas according to risk of infestations developing. Develop management protocols for areas /sites. - removal, monitoring, disposal of prunings etc. - follow up, schedule of monitoring	All state and territory governments, local government, urban residents, land managers, landcare groups. Management committee.	1 2 2
2.3.2 Manage high priority infestations.	Develop a communications plan targeting land managers. Ensure that supporting infrastructure is in place. Implement management plans and map infestations. Follow up inspections of management plan implementation according to protocol.	All state and territory governments, local government, urban residents, land managers, landcare groups.	2 2 3 3
2.3.3 Manage remaining areas.	Routine and ongoing public awareness on the harmful effects of athel pine and available replacement species.	All state and territory governments, local government, landcare.	2

2.4 The coordination of strategic athel pine management.

Current and potential infestations of athel pine cover large areas of Australia with infestations impacting across borders. To effectively manage these areas commitment and coordination is needed at a national level.

The objectives and actions outlined below provide the structure for this coordination and set the stage for a national commitment to be managed for the greatest benefit and success.

Strategy	Actions	Responsibility	Rank
2.4.1 Coordinate the implementation of the strategy.	Identify stakeholders.	Interim management committee.	1
	The formation / appointment of a National Athel pine coordinating committee.	All stakeholders	1
	Define appropriate control and management approaches. - education / information.	Management committee	2
	Set priorities for control / management.	state and local	2
	Identify available resources or potential sources of resources.	government	2
	Implement strategic management.	Management committee	2
2.4.2 Monitor and evaluate the implementation of the strategy.	Develop and implement a national reporting framework and procedure.	Management committee	2
	Review effectiveness of implementation.	Management committee	3

3 MONITORING AND EVALUATION

This management plan will be subject to a 5-year cycle of review.

The Athel Pine Management Group will monitor and evaluate the efficacy of this strategy.

Performance Indicators

A range of performance indicators for the planned actions are listed below:

- Appropriate declaration by all States and Territories of athel pine.
- Stopping the import of all weedy *Tamarix* species.
- Increased awareness of athel pine as a weed of national significance.
- Increased information exchange between states on control activities and research.
- Clear understanding of the social, economic and environmental impacts of athel pine.
- Increased delivery of extension material specific to target groups and sites.
- Integration of athel pine management into relevant plans and actions.
- Increased surveys and eradication of isolated infestations of athel pine.
- Increased involvement of landholders and the community in athel pine management.
- Eradication of riverine infestations of athel pine.
- Increased resources for on-ground actions.
- Increased action on athel pine at all levels- property, catchment and regional.
- Increased awareness of best management practices.
- An accurate and thorough assessment of the current problems with athel pine control.
- Areas for athel pine treatment identified and prioritised.
- Research carried out to fill gaps in knowledge of biology and control.
- Continued control in core area of infestation.
- No expansion in current Athel pine distribution.
- Reduction in the area of Athel pine and its impact.
- Restoration of riparian ecology.

4 STAKEHOLDER ROLES AND RESPONSIBILITIES

Private Landholders

To control / manage athel pine on their own lands and prevent spread to surrounding lands including:

- Developing property management plans which include athel pine control
- Implement best practice management for athel pine
- Eradicate strategic infestations.

To be aware of the potential for athel pine to spread onto their own lands

- Follow good hygiene practices e.g. clean mud and/or seed from animals, footwear and machinery
- Be able to identify athel pine and other woody weeds.

Local Governments and Authorities

Ensure impacts of athel pine are kept to a minimum throughout the local government area:

- Ensuring that pest management plans include strategic athel pine control activities
- Ensuring that strategic athel pine control is undertaken on all lands under the local authority control including stock-routes, roadsides and town commons. Survey commons/reserves infested – map location and density
- Ensuring that all private landholders engage in strategic athel pine control activities
- Liaise with government departments and community groups to undertake strategic athel pine control
- Administer and enforce the provisions of relevant Acts.
- Recognise the need for resource allocation on determined priorities for athel pine control.
- Train other sections of local authorities on weed issues.

Utility companies /Agribusiness / Industry

- Develop protocols and washdown facilities
- Ensure awareness of characteristic of the weed
- Become involved in management plans in service regions.
- Alert agencies of new infestations
- Provide input into mapping exercises.

QDNR/ NTDPIF/ AgWA/ NSWAg/ APCC

To ensure that the social, economic and environmental impacts of athel pine are kept to a minimum throughout the State by:

- Continuing to develop efficient, effective, and appropriate control techniques
- Providing extension and education services to both rural and urban communities
- Developing best practice management under adaptive management programs
- Increasing knowledge on vegetative propagation and seedling germination.
- Support local government enforcement of controls of athel pine under the Act
- Liaising with community and industry groups and local governments to coordinate local athel pine control activities

Other Government Departments in States

- Assist in development of codes of practice on athel pine management and ensure uptake by departmental staff
- Ensure athel pine control is undertaken on all State managed lands.
- Ensure awareness of characteristics and identification of the species.

Other States and Territories

- To ensure awareness and early detection programs are put in place
- To eradicate isolated infestations when found
- To declare athel pine in all states.

Federal Government Agencies

- Maintain quarantine barrier controls to minimise new introduction of genetic material (Australian Quarantine and Inspection Service)
- Ensure athel pine control is undertaken on all lands under management (Defence, Environment Australia).
- Oversee and manage federal funds including Natural Heritage Trust and National Weed Program (Environment Australia; Agriculture, Forestry and Fisheries – Australia).

5 ADDITIONAL READING

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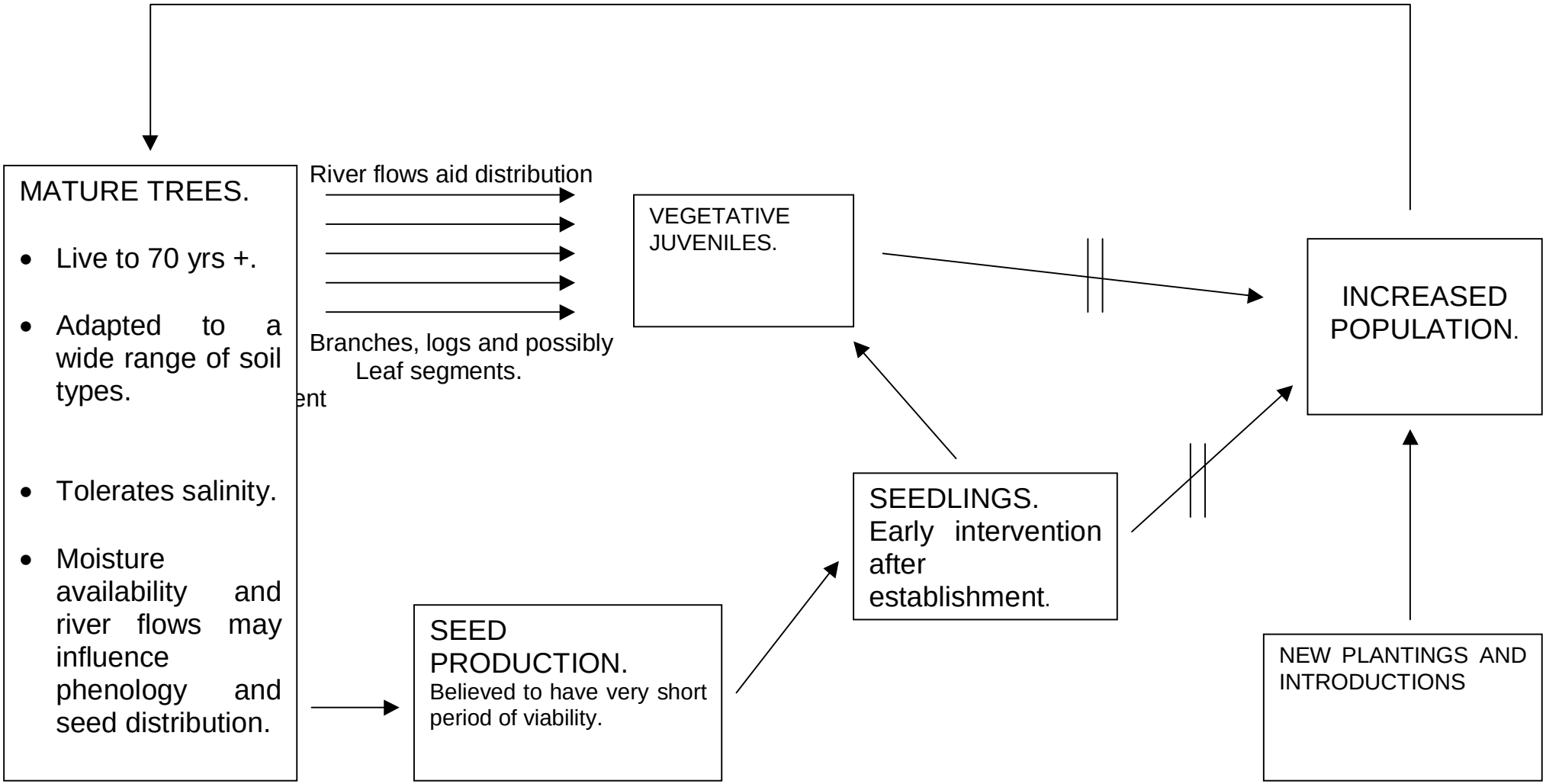

Appendix 1: Lifecycle diagram of athel pine used in management planning.

APPENDIX 2. PROCESS USED TO DEVELOP THE NATIONAL ATHEL PINE STRATEGY.

The national *Athel Pine Strategy* is the product of several years of planning. A workshop was held at the Arid Zone Research Institute – Alice Springs on 17 July 2000, which led to the development of the national strategy released for public comment on 1 August, 2000.

Much of the introductory information contained within this strategy was taken from the draft NT Athel Pine Strategy provided.

Individuals and Organisations that contributed to the national Athel Pine Strategy:

The lead agency for the formation of the national *Athel Pine Strategy* was the Northern Territory Department of Primary Industry and Fisheries

Collator – John Gavin BSc (Env. Sc.), AdDip (Land Man'gt.).

The delegates at the July national workshop, that developed the outline for the strategy and commented on the resultant document, were;

DPI&F, (NT) Murray Fuller, John Gavin, John Pitt.
PIRSA, (SA) Paul Jupp
DNR, (Qld) Peter Mackey
Centralian Land Managers Association Will Dobbie

Facilitator:
Mr John Thorp (Project Manager, National Weeds Strategy)

Additional feedback from the public release of the draft strategy was received from:
CALM (WA)
Agriculture WA
Department of Land and Water Conservation (NSW)
Greening Australia (NT).
Threatened Species Network (NT)
Various individual landholders and community members.