

Recovery plan for the angle-stemmed myrtle *Austromyrtus gonoclada* 2001-2005

Prepared by Fiona McNeill for the *Austromyrtus gonoclada* Recovery Team



**Recovery plan for the angle-stemmed myrtle *Austromyrtus gonoclada*
2001-2005**

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Summary

Current species status

Austromyrtus gonoclada is listed in the 1997 IUCN Red List as endangered (Walter and Gillett 1998). It is listed as endangered in the Queensland *Nature Conservation (Wildlife) Regulation 1994* (Schedule 2, Part 2) and under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Habitat requirements and limiting factors

Austromyrtus gonoclada is found below the peak flood level on alluvial terraces along permanent watercourses that are subject to some degree of tidal influence. Its habitat consists of remnant lowland riparian rainforest, situated between the Logan and Brisbane Rivers. The species is known from nine sites, which contain 73 individual naturally-grown trees. The recovery team has been successful in propagating 299 trees and has planted 212 of these at both existing (113 individuals) and new sites (99 individuals) to date. The total number of *A. gonoclada* in the wild is now 285 individuals. Threatening processes include clearing of habitat, livestock damage, competition from weeds and illegal and inappropriate collecting of seeds and cuttings. Impacts from land use in the surrounding areas and human visitation may also be a threat to the long-term survival of the species.

Critical habitat

As so few individuals remain, all areas where the species occur (including those sites where the species has recently been established) are considered critical and should be protected accordingly.

Recovery objectives

General objective

To arrest the decline of *Austromyrtus gonoclada* in the wild and to maintain the viability of *in situ* populations.

Specific objectives

1. To secure existing populations.
2. To increase the number of individuals in existing populations through controlled cultivation and propagation.
3. To increase the distribution of the species by establishing new populations.
4. To increase understanding of reproductive biology to enable better management decisions to be made.
5. To maintain community involvement in the species' recovery.

Recovery criteria

1. All known populations are incorporated into conservation reserves or protective agreements have been made with landholders.
2. The wild population has increased to at least 500 individuals.
3. The distribution of the species is to be expanded by further population establishment.

Recovery actions

1. Locate new populations.
2. Provide secure habitat by negotiating a conservation agreement with the appropriate management authority or landholder.
3. Undertake ecological investigations.

4. Undertake controlled cultivation and propagation to ensure representative sampling of the genetic diversity of the species and supplement existing populations with genetically diverse stock.
5. Establish new populations within appropriate habitat in southeast Queensland.
6. Facilitate local community awareness and involvement in the conservation of the species.
7. Manage and reduce threats for each population.

Estimated cost of recovery (in \$)

Year	Action 1	Action 2	Action 3	Action 4	Action 5	Action 6	Action 7	Total
2001-02	200	0	3,000	1,100	12,400	0	2,700	19,400
2002-03	200	0	3,000	1,100	9,300	1,000	1,700	16,300
2003-04	150	0	3,000	500	9,300	500	1,700	15,150
2004-05	150	0	1,000	500	12,400	0	1,700	15,750
Total	700	0	10,000	3,200	43,400	1,500	7,800	66,600

Biodiversity benefits

- Retention of remnant riparian vegetation in areas that surround *A. gonoclada* populations.
- Habitat benefits for other plant species that are uncommon in the region, including *Hydrocotyle verticillata*, *Rapanea howittiana*, *Vitex trifolia* var. *bicolor*, *Beilschmiedia obtusifolia*, *Rhodamnia argentea*, *Wilkia huegeliana*, *Austromyrtus acmenoides* and *Siphonodon australe*. *Symplocos harroldii* has also been found in the region and is considered rare (Queensland *Nature Conservation (Wildlife) Regulation 1994*).

1.0 Background

This recovery plan is an update on the original recovery plan written by D. Halford in 1996. The aim of this plan is to identify recovery actions necessary for conservation and future down-listing of the species from endangered to vulnerable. The plan also describes the achievements of the recovery team in protecting and enhancing populations of *Austromyrtus gonoclada*.

Charles Stuart first discovered *Austromyrtus gonoclada* in Moggill (located on the western outskirts of Brisbane, Queensland) in the 1850s. Glenn Leiper and Janet Hauser rediscovered the species in December 1986, stimulating interest in searching for populations in the Moreton Bay region. The *Austromyrtus gonoclada* Recovery Team was formed in December 1995 with the aim of arresting the decline of the species in the wild and maintaining viable *in situ* populations.

The recovery team has successfully integrated community groups and local councils to achieve the protection of an endangered species.

1.1 Description of the species

The following description of *Austromyrtus gonoclada* is adapted from Bailey (1900) and Hauser (1992).

A. gonoclada grows to a height of about 18m with a dense canopy of glossy, deep green foliage. The new leaves have a pink flush and the bark is pale brown in colour and is either flaky or scaly. The most distinctive characteristics of this species are the four raised corners on the angled branchlets and the unique scent of the leaves when crushed (G. Stephens, pers. comm.). Leaves are opposite on petioles which are up to 4mm long. The leaves grow to 36mm long and 20-35mm wide. They are elliptic in shape with a short blunt tip. Numerous intermarginal veins, that are not very closely packed, may be seen (Bailey 1900). The upper leaf surface is glossy and dark green and the lower surface, dull and paler. Small translucent oil glands, distinctive of the Myrtaceae family, occur on both leaf surfaces and produce a distinctive perfume. The flowers are white, 6-9mm in diameter, and occur singly in the leaf axis. The flowers have 4-5 smooth petals. The fruit is a globular, glossy, soft fleshed berry 7-12mm in diameter. The fruit turns black when ripe (usually in January to February) and retains its calyx lobes at the tip.

1.2 Distribution and population size

The current geographical range of the species (excluding planted trees) ranges from the lower reaches of the Brisbane and Logan Rivers and their tributaries. Herbarium specimens dating back to the 1800s were collected from Moggill and New Farm, southeast Queensland. There have been no rediscoveries of the species in these areas, despite active searching. Since 1986, *A. gonoclada* has been found in nine different localities in the Moreton Bay region, all within a 30km radius and are described below. There are 73 individual, mature trees existing within the boundaries of Logan City and Brisbane City. A further 212 trees have been propagated and planted in this region. A summary of the locations, number of naturally occurring specimens and the number planted at these sites is provided in Table 1.

Site 1: Murray's Rd, Tanah Merah

The Murray's Road site, 26km south east of Brisbane, has four fragmented *A. gonoclada* populations with 59 individual plants, making it the largest known population of the species. All of these trees are protected by Logan City Council's tree preservation by-laws. The *A. gonoclada* populations found in these areas grow

on the gentle slopes and alluvial terraces of Slacks Creek, 5-10m above sea level. The soils, derived from Cainozoic alluvium, are well-drained medium to heavy clays that may occasionally be gravelly. This area can be subject to floodwaters for up to three days and be influenced by slightly saline flooding during large spring tides (G. Leiper, pers. comm.). The remnant vegetation along the riparian zone is simple notophyll vine forest. The dominant species include *Syzygium francisii* (giant watרגum), *Acmena smithii* (narrow-leaved lilly pilly) and the native vines *Trophis scandens* (burneyvine) and *Maclura cochinchinensis* (native cockspur vine). The northern area bounded by Slack's Creek contains the mangroves *Excoecaria agallocha* (milky mangrove) and *Aegiceras corniculatum* (river mangrove). The adjoining forest is dry sclerophyll dominated by *Eucalyptus tereticornis* (forest red gum). Of significance are *Hydrocotyle verticillata*, a rarely recorded herb of marshy areas, *Rapanea howittiana*, a species rarely recorded in Queensland, and *Vitex trifolia* var. *bicolor*. This is the most westerly occurrence of the latter species.

Murray's Private Property (Lot 2 RP 842282)

Murray's Private Property contains the largest known stand of *A. gonoclada*. Genetic research conducted by Playford *et al.* (1996) has determined that there are 49 individuals. The remaining stems are suckers from the mature plants. Murray's Private Property is freehold land and is mainly used for cattle grazing. Introduced pasture species and weeds surround remnant vegetation where *A. gonoclada* occurs. The remnant vegetation is fenced and revegetation work has improved the condition of the site. The owners support future protection of *A. gonoclada* on their property.

Murray's Environmental Reserve (Portion 285; Lots 1, 2, 3 on RP 893949)

This site is located along Slack's Creek and has an *A. gonoclada* population of eight mature trees. This area is under the joint trusteeship of Logan City Council and the Environmental Protection Agency and is managed by Logan City Council. The Society for Growing Australian Plants (SGAP), Logan City Council Bushland Management Unit and *A. gonoclada* Recovery Team have conducted planting of an additional 27 trees.

Logan Motorway (Lot 38 RP 137607)

One *A. gonoclada* tree was found on this site which is owned by the Logan Motorway Company. This site is adjacent to Murray's Private Property and the tree has been fenced in with those on the Murray's property.

Murray's Road Reserve

A single *A. gonoclada* tree has been located on Murray's Road Reserve. This area is owned and managed by Logan City Council.

Site 2: Usher Park, Daisy Hill

Usher Park, located approximately 2km north of the Murray's Road in suburban Daisy Hill, contains three mature *A. gonoclada* plants, one of which has successfully regenerated after being cut down. The area is registered as a park and is managed by Logan City Council. Remnant vegetation is found in the riparian zone, which contains the *A. gonoclada* trees. All trees are protected by tree preservation by-laws of the Logan City Council. An additional 21 trees have been established at this site.

The vegetation community is notophyll vine forest dominated by *Lophostemon confertus* (brush box), *Acacia disparrima* (hickory wattle), *Cryptocarya microneura* (murrogun), *Elaeocarpus obovatus* (hard quandong) and *Jagera pseudorhus* (foambark). The soil along the river is light brown clay of similar Cainozoic alluvial

derivation to that of Murray's Road. Although there is no tidal inundation, flooding of the alluvial terrace does occur at peak flows.

Site 3: Alexander Clark Park, Loganholme

Alexander Clark Park is a registered as a crown reserve for park and recreation and is managed by Logan City Council. There are two mature *A. gonoclada* trees on the upper and lower alluvial terraces of Logan River. They are protected by the tree preservation by-laws of Logan City Council. An additional 31 trees have been planted in the surrounding re-vegetated area.

The vegetation community of the alluvial terrace is a mixture of both rainforest and sclerophyll forest. The dominant native species include *Casuarina glauca* (swamp oak), *Melaleuca bracteata* (river tea tree), *Eucalyptus tereticornis* (forest red gum), *Toechima tenax* (pitted-leaf steelwood), *Callistemon viminalis* (weeping bottlebrush) and the common vines *Parsonsia straminea* (monkey-rope vine) and *Maclura cochinchinensis* (native cockspur vine).

Site 4: Nosworthy Park, Corinda

Nosworthy Park is located along the banks of Oxley Creek in Corinda. It is approximately 30km north west of the Murray's Road site and 12km south west of Brisbane city. The park is listed as a local government recreation reserve and is managed by Brisbane City Council. A mature *A. gonoclada* tree exists within the remnant natural vegetation strip along the alluvial terrace, at an elevation of about 50m ASL. Brisbane City Council has placed the tree under a vegetation protection order. A further 18 trees have been planted at this site.

The remnant riparian vegetation is on moderately well drained, light clay soils with a high organic content, making them appear brownish black. The soils are derived mainly from Cainozoic alluvium. The species present include *Argyrodendron trifoliolatum* (white booyong), *Pouteria cotinifolia* var. *cotinifolia* (small-leaved coondoo) and *Syzygium francisii* (giant water gum).

Considerable rehabilitation has occurred at this site over the past 10 years. Greening Australia in conjunction with Brisbane City Council maintains this area.

Site 5: Cliveden Avenue, Corinda

The Cliveden Avenue site is approximately 1.3km north of Nosworthy Park. It is located on Oxley Creek at the end of Cliveden Avenue, approximately 13km from Brisbane city. Three of the original trees are located on Brisbane City Council owned land (Lot 3, 4 RP 29675) beside Oxley Creek, which is leased and managed by the local Pony Club. One tree is located on adjacent Uniting Church land (Lot 2 RP 29673) on a tributary of Oxley Creek. All trees are covered by the vegetation protection by-laws of Brisbane City Council. An additional 16 *A. gonoclada* trees have been planted at the Pony Club site.

The area surrounding the riparian vegetation is open pasture. The remnant vegetation has been invaded by several exotic species, in particular, *Schinus terebinthifolia* (larger broad-leaf pepper tree) and *Celtis sinensis* (Chinese elm). The remaining native species include *Casuarina glauca* (swamp oak), *Melaleuca bracteata* (river tea tree), *Jagera pseudorhus* (foambark), *Acmena smithii* (narrow-leaved lilly pilly), *Cupaniopsis anacardioides* (tuckeroo), *Toechima tenax* (pitted-leaf steelwood) and *Parsonsia straminea* (monkey-rope vine). The soils are well drained and range from loam to medium clays.

Site 6: Aminga Street, Fig Tree Pocket

This site is located opposite the corner of Jesmond Road and Aminga Street on Brisbane City Council owned parkland, approximately 9km from Brisbane city. The single, mature tree on this site is situated on a steep slope of the bank of Cubberla Creek. The surrounding remnant vegetation is lowland riparian dry vine forest and notophyll vine forest. Exotic trees and creepers make up a large proportion of the dominant vegetation. The Rainbow Forest Park Experimental Rehabilitation Group manages this area.

This site becomes surrounded by water during peak floods. It is situated on a weathered Bunya Phyllite ridge on the eastern side of the creek and has deep alluvial deposits on the western side of the creek. The soils of this area are derived from metamorphic Bunya Phyllite parent material (G. Stephens, pers. comm.). The dominant native species of the area include: *Acronychia pauciflora*, *Alyxia ruscifolia* (chainfruit), *Austromyrtus bidwillii* (python tree), *Elaeagnus xylocarpa* (white tamarind), *Flagellaria indica* (bull cane), *Morinda acutifolia* (veiny morinda), *Syzygium francisii* (giant water gum), *Jagera pseudorhus* (foambark), *Lomandra longifolia* (spinyhead matrush), *Citrus australis* (native lime) and *Elaeocarpus obovatus* (hard quondong). This area also contains a number of locally rare, native species such as *Beilschmiedia obtusifolia* (bush walnut), *Rhodamnia argentea* (malletwood), *Symplocos harroldii* (hairy hazelwood), *Wilkiea huegeliana* (veiny wilkea) and *Austromyrtus acmenoides* (scrub ironwood). The native species *Actephila lindleyi*, *Rhodamnia dumicola* (rib-fruited malletwood), *Decaspermum humile* (silky myrtle), *Mischocarpus anodontus* (pear fruit) and *Morinda acutifolia* (veiny morinda), although fairly common species, are very rare in the Cubberla Creek catchment area.

Site 7: Manaton Park, Fig Tree Pocket

The single 10m tall, *A. gonoclada* tree is located at the base of a steep slope on a tributary of the Brisbane River. Brisbane City Council owns the site. The surrounding vegetation is remnant riparian vine forest which is infested on the edges with several climbing weeds including *Hiptage benghalensis* (hiptage), *Macfadyena unguis-cati* (cats claw creeper), *Cardiospermum grandiflorum* (balloon vine) and *Asparagus africanus* (climbing asparagus). These weeds make up much of the dense canopy and are engulfing many of the native species.

The soils of this area are riverine alluvial and shallow chromosols over Bunya Phyllite bedrock. The site experiences periodic inundation during large floods. The dominant native species include *Acacia melanoxylon* (blackwood), *Ailanthus triphysa* (white bean), *Araucaria cunninghamii* (hoop pine), *Bridelia exaltata* (scrub ironbark), *Cryptocarya bidwillii* (yellow laurel), *Diospyros geminata* (scaly ebony), *Ficus coronata* (creek sand-paper fig), *Grevillea robusta* (silky oak), *Jagera pseudorhus* (foam bark) and *Lophostemon confertus* (brush box). Various vines such as *Smilax australis* (Australian sarsaparilla) and *Trophis scandens* (burneyvine) are also found on the site, as are the estuarine species *Aegiceras corniculatum* (river mangrove), *Crinum pedunculatum* (Brisbane River lily) and *Amylotheca dictyophleba* (mistletoe). The native species *Argyrodendron trifoliolatum* (white booyong), *Polyalthia nitidissima* (canary beech) and *Pararchidendron pruinosum* (snow wood) are locally uncommon in the Cubberla Creek catchment area.

Site 8: Lone Pine, Fig Tree Pocket

The single *A. gonoclada* found at this site is situated on the steep upper bank (consisting of Bunya Phyllite) of the Lone Pine Reach of the Brisbane River, at the height of peak flood level. The area is fenced off from the adjacent Lone Pine Koala Sanctuary picnic grounds. The exact tenure of this riparian corridor is unknown, although is currently under investigation by Brisbane City Council. The *A. gonoclada*

at this site is thought to have suffered some damage in the past, resulting in a suckering habit (G. McDonald & T. McHugh, pers. comm.). There are currently 14 vertical stems thought to have originated from the same root stock. The largest of these stems is 4m tall and 30mm wide (G. McDonald, pers. comm.).

The vegetation surrounding the population is remnant riparian rainforest with emergent *Eucalyptus tereticornis* (forest red gum) and dense undergrowth of exotic species. The most dominant native species include: *Aegiceras corniculatum* (river mangrove), *Araucaria cunninghamii* (hoop pine), *Acacia disparrima* (hickory wattle), *Alectryon tomentosus* (hairy bird's eye), *Cupaniopsis parvifolia* (small-leaved tuckeroo), *Siphonodon australe* (ivorywood), *Eucalyptus tereticornis* (forest red gum), *Eucalyptus crebra* (narrow-leaved ironbark), *Capparis arborea* (caper), *Carissa ovata* (currant bush), *Austrosteenisia blackii* (blood vine), *Geitonoplesium cymosum* (scrambling lily), *Trophis scandens* (burneyvine), *Maclura cochinchinensis* (native cockspur vine) and *Toechima tenax* (pitted-leaf steelwood). Ivorywood (*Siphonodon australe*) is found in this area and is an uncommon tree, usually occurring in coastal rainforest and rarely found in the Brisbane area.

Site 9: CSIRO, Long Pocket

A single tree has been found in the CSIRO complex, Meiers Road, Long Pocket, Brisbane. The tree is located in an arboretum and it is suspected that it may have been planted. The naturally occurring native species are unknown. The soil of this site is thought to be alluvial. There is little threat to the site other than potential expansion of development.

Table 1: Summary of original locations and numbers of trees planted at these sites (Note: Table 3 summarises sites at which new populations have been established).

Site No.	Location	Land tenure	No. original trees	No. trees planted
1a	Murray's private property, Tanah Merah	Freehold	49	0
1b	Murray's Envir. Reserve, Tanah Merah	State land	8	27
1c	Logan Motorway, Tanah Merah	Freehold	1	0
1d	Murray's Road reserve, Tanah Merah	Council land	1	0
2	Usher Park, Daisy Hill	Council land	3	21
3	Alexander Clark Park, Loganholme	State land	2	31
4	Nosworthy Park, Corinda	Council land	1	18
5	Cliveden Avenue, Corinda	Council land	4	16
6	Aminga Street, Fig Tree Pocket	Council land	1	0
7	Manator Park, Fig Tree Pocket	Council land	1	0
8	Lone Pine, Fig Tree Pocket	Unknown	1	0
9	CSIRO, Long Pocket	State land	1	0
		Total	73	113

1.3 Habitat requirements

Austromyrtus gonoclada may be naturally found on sloping or flat alluvial terraces of permanent waterways, which experience some degree of tidal influence and are at an elevation of 5-50m ASL. It is usually found growing below the peak flood level. A.

gonoclada may be found growing in lowland riparian rainforest or in association with notophyll vine forest species, in the subtropical areas of south-east Queensland.

1.4 Life history

The species regenerates vegetatively from stem suckers following damage to the main stem. The seed recruitment levels are low, which may be a reflection of habitat disturbance or due to an indirect effect this disturbance has on the species' pollinators.

1.4.1 Flowering and fruiting

Austromyrtus gonoclada buds and flowers in late spring (October to November) with the fruits ripening from mid-January to February. The fruits, like fruits of many rainforest species, remain viable for only a short period. The quantity of fruit produced by individual specimens and the viability of the seeds varies markedly from year to year. Trees found in more open habitat appear to produce more viable seeds. *Austromyrtus gonoclada* produces only a small quantity of fruit in a season. The low production of fruit has been attributed to several factors such as self-incompatibility and shading. The unspecialized flowers, similar to those of many species in the Myrtaceae, suggest that insects are pollinators (Beardsell *et al.* 1993). Native bees have been suggested as likely pollinators, although this is yet to be confirmed.

1.4.2 Seed dispersal and germination

As the seeds are located within a sweet, soft and fleshy fruit, it is suspected that they are dispersed by animals, particularly birds and bats. Other animals such as lizards, small mammals and tortoises may also play a role in seed dispersal (G. Stephens, pers. comm.). The fruit is edible for humans (G. Leiper pers. comm.). At the Murray's Road sites, silvereyes (*Zosterops lateralis*) and figbirds (*Sphecotheres viridis*) have been seen feeding on the fruits of *A. gonoclada*. The figbirds consume the entire fruit, whereas the silvereyes peck at the soft flesh causing the seed to drop directly under the trees (G. Leiper, pers. comm.). Gravity and water may also play a significant role in dispersal due to the proximity of the trees to waterways, although the fruit does not float (J. Playford, pers. comm.).

The germination period is 8-60 days from the time of sowing, with a success rate ranging from 0-95% (G. Stephens, pers. comm.). Nursery-grown seedlings can reach 30cm in height within 12 months.

1.4.3 Genetics and propagation

Preliminary genetic studies by Shapcott and Playford (1996) have determined that there has been no loss of genetic variability, possibly due to *A. gonoclada* being part of a once larger population, which has been drastically reduced.

1.5 Threats and reasons for decline

The main threats for all *A. gonoclada* populations are clearing and exotic weed invasion. Weeds may out-compete *A. gonoclada* and associated native species. Other possible threats include illegal or inappropriate collection of cuttings and seeds, repeated grazing or damage from livestock and inbreeding depression due to the very limited number of individuals in the species. Land use activities in adjacent areas may also have an impact on the populations. For example, excessive use of fertilizers on adjoining land may lead to an increase in the nutrient load due to runoff. Increased human traffic around the trees, resulting in soil compaction, may also threaten the long-term survival of the species. Table 2 provides a summary of the threats to each natural population and the steps in place to alleviate them.

Table 2: Threats to the original populations of *A. gonoclada* and the steps that have been taken to assist their survival.

Site	Populations	Threats	Steps taken to alleviate threats
1	Murray's Road, Tanah Merah	Exotic weed invasion Livestock grazing Waste disposal Inbreeding depression	Weed control Site has been fenced to exclude cattle Log-rail fences erected to limit vehicle access to rubbish dumping sites Trees protected under local government and State legislation
2	Usher Park, Daisy Hill	Human recreational impacts Exotic weed invasion Inbreeding depression	Numbers enhanced with plants propagated from different populations Paths built to encourage people not to walk near the plants Weed control Trees protected under local government and State legislation
3	Alexander Clark Park, Loganholme	Human recreational impacts Exotic weed invasion Inbreeding depression	Numbers enhanced with plants propagated from different populations Weed control Trees protected under local government and State legislation
4	Nosworthy Park, Corinda	Human recreational impacts Exotic weed invasion Inbreeding depression	Numbers enhanced with plants propagated from different populations Paths built to encourage people not to walk near the plants and signs have been erected Weed control Trees protected under local government and State legislation
5	Cliveden Avenue, Corinda	Golf Course construction Damage from horses and slashing Exotic weed invasion Inbreeding depression	Numbers enhanced with plants propagated from different populations Trees have been fenced Weed control Trees protected under local government and State legislation
6	Aminga Street, Fig Tree Pocket	Exotic weed invasion Inbreeding depression	Trees protected under local government and State legislation Weed control
7	Manaton Park, Fig Tree Pocket	Exotic weed invasion Increased nutrient load from runoff Inbreeding depression	Trees protected under local government and State legislation Weed control
8	Lone Pine, Fig Tree Pocket	Weed invasion Excessive pruning Inbreeding depression	Trees protected under local government and State legislation
9	CSIRO, Long Pocket	Future development Inbreeding depression	Trees protected under local government and State legislation

1.6 Existing conservation measures

Although new populations have been discovered since 1995 and highly successful replanting strategies have occurred, *Austromyrtus gonoclada* remains listed as endangered in the 1997 IUCN Red List (Walter and Gillett 1998) as the population has fewer than 250 mature plants located within a radius of 100km (IUCN 2001). While the *A. gonoclada* population has already reached 285 individuals, they will not become self-sustaining until all propagated seedlings have matured. The age and/or size of the tree when maturity is reached is unknown.

Since the formation of the *Austromyrtus gonoclada* Recovery Team in December 1995, the number of naturally existing and planted *A. gonoclada* has reached 285 individuals. Of which, 212 have been propagated and planted – 113 at sites where the original plants were found and 99 at new locations. Another 88 are yet to be planted. Currently, there are only 12 trees that produce viable seed and cuttings have been collected from nine trees.

All the trees are protected from destruction by tree preservation by-laws of local councils and it is an offence to destroy, remove or collect seeds and cuttings from a protected plant under the Queensland *Nature Conservation Act 1992*.

Refer to Table 2 for a summary of the steps that have already been taken to assist in the conservation of the species.

2.0 Recovery objectives and criteria

The overall objective of the recovery plan is to arrest the decline of *A. gonoclada* in the wild and to maintain viable *in situ* populations.

2.1 Specific objectives

1. To secure existing populations.
2. To increase the number of individuals in existing populations through controlled cultivation and propagation.
3. To increase the distribution of the species by establishing new populations.
4. To increase understanding of reproductive biology to enable better management decisions to be made.
5. To maintain community involvement in the species' recovery.

2.2 Recovery criteria

1. All known populations are incorporated into conservation reserves or protective agreements have been made with landholders.
2. The wild population has increased to at least 500 individuals.
3. The distribution of the species is to be expanded by further population establishment.

2.3 Recovery actions

1. Locate new populations.
2. Provide secure habitat by negotiating a conservation agreement with the appropriate management authority or landholder.
3. Undertake ecological investigations.
4. Undertake controlled cultivation and propagation to ensure representative sampling of the genetic diversity of the species and supplement existing populations with genetically diverse stock.

5. Establish new populations within appropriate habitat in southeast Queensland.
6. Facilitate local community awareness and involvement in the conservation of the species.
7. Manage and reduce threats for each population.

Action 1: Locate new populations

Searches have been conducted in the vicinity of known populations, the localities where herbarium specimens have been collected and in areas where remnant riparian rainforest still exists in coastal south-east Queensland. No other populations than those listed in this recovery plan have been found, despite intensive searching of suitable habitat by members of the recovery team in 2000 and 2001.

Action 2: Provide secure habitat

With the exception of the CSIRO and Lone Pine sites, all of the trees are protected by tree preservation by-laws of the respective local councils. Negotiations are underway to protect the remaining trees.

Action 3: Ecological investigations

The relationship between soil moisture and *Austromyrtus gonoclada* has been investigated and this information will be used in planning replanting strategies. The conductivity of soil around existing plants will be measured to establish the levels of salinity. Pollination experiments will also be conducted. All of the existing mature trees are being monitored.

Action 4: Controlled cultivation and propagation

Seedlings and/or cuttings are to be collected from every known mature tree. At least two plants from each of the viable, genetically dissimilar, mature trees will be established at sites where there are known populations. Supplementary planting has occurred at five sites (Table 1). These plants will continue to be monitored. A seed orchard has been established at the Logan City Golf Club, where equal numbers of offspring from all of the mature trees have been randomly distributed throughout the site.

Action 5: Establish new populations

A. gonoclada has been established at eight additional sites, within the historical range of the species. A further five sites have been identified as suitable for establishing new populations and will be planted when propagated stock becomes available. Table 3 provides a summary of these locations. At these sites, the area is rehabilitated and re-vegetated if necessary. Weed control is on-going at all sites.

Table 3: Locations where new populations have been established or are planned.

Location	No. trees established
Logan City Golf Course, Logan	24
Riverdale Park, Meadowbrook	18
Allen Street, Corinda	6
Rafting Ground Reserve, Pullenvale	21
Rainbow Forest Park, Indooroopilly	13
Sutling Street, Corinda	5
Mt Coot-tha Botanic Gardens, Toowong	2
Sherwood Arboretum, Sherwood	10

Areas proposed for new populations	No. trees allocated
Leslie Parade Park, Slacks Creek	11
Indigiscapes Centre, Redlands	4
Woogaroo Creek, Ipswich	10
Fredrick Johnson Park, Pimpama	14
Rare and Threatened Species Botanic Garden, Bundamba	2

Action 6: Community awareness

Public awareness and education has been achieved through a display and a brochure. Two copies of the 3-panel display have been produced and the Logan and Brisbane City Councils each hold a copy. The displays are exhibited at various community and environmental events held in these areas. Media releases on planting days provide a means of notifying the local community and encouraging their involvement. A number of schools, community groups and environmental organizations have been involved in maintaining sites, collecting seeds and cuttings, searching for new populations, propagating and planting trees. Community involvement in carrying out the recovery actions will continue to be sought.

Action 7: Manage threatening processes

At all sites, the *A. gonoclada* plants either are fenced or will be fenced to exclude both livestock and human disturbance, wherever necessary. Weed control, site maintenance and re-vegetation is being conducted or is planned. Any new populations of *A. gonoclada* will be protected from destruction by tree preservation by-laws of local councils or under the provisions of the Queensland *Nature Conservation Act 1992*, as is the case for known populations.

3.0 Implementation schedule

Action	Responsible Party	Estimated cost (\$)				
		2001-02	2002-03	2003-04	2004-05	Total
1. Conduct surveys for new populations	Trust fund	200	200	150	150	700
2. Provide secure habitat	Logan CC and Brisbane CC	0	0	0	0	0
3. Ecological investigations	Trust fund	3,000	3,000	3,000	1,000	10,000
4. Cultivate species and supplement existing populations	Logan CC, Brisbane CC and Trust fund	1,100	1,100	500	500	3,200
5. Establish new populations	Logan CC, Brisbane CC and Trust fund	12,400	9,300	9,300	12,400	43,400
6. Community awareness & involvement	Logan CC and Brisbane CC	0	1,000	500	0	1,500
7. Manage and reduce threats	Logan CC, Brisbane CC and Trust fund	2,700	1,700	1,700	1,700	7,800
Totals		19,400	16,300	15,150	15,750	66,600

4.0 Recovery team

The inaugural meeting of the *Austromyrtus gonoclada* recovery team was held in January 1996. The recovery team has the following representation:

- Logan City Council
- Brisbane City Council
- Jim and David Murray
- Queensland Parks and Wildlife Service
- Greening Australia, Queensland
- The Society for Growing Australian Plants
- Toona Rainforest Nursery
- Jacobs Well Environmental Education Centre
- Environment Australia
- Cubberla Creek Bushcare Group
- Oxley Creek Environment Centre

5.0 Acknowledgements

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6.0 References

- Bailey, F.M. 1900. *The Queensland Flora, Part II*. H.J. Diddams & Co., Brisbane.
- Beardsell, D.V., O'Brien, S.P., Williams, E.G., Knox, R.B. and Calder, D.M. 1993. Reproductive biology of the Australian Myrtaceae. *Australian Journal of Botany* **41**: 511-526.
- Hauser, P.J. 1992. *Fragments of Green, an identification field guide for rainforest plants of the Greater Brisbane region*. Rainforest Conservation Society Inc., Bardon.
- IUCN. 2001. *IUCN Red List Categories: Version 3.1*. Prepared by the IUCN Species Survival Commission. IUCN, Gland, Switzerland and Cambridge, U.K.
- Playford, J., Shapcott, A. and Guymer, G. (1996). *Conservation genetics and the ecology of the endangered plant Austromyrtus gonoclada*. Report submitted to the Queensland Department of Environment.
- Shapcott, A. and Playford, J. (1996). Comparison of genetic variability in remnant and wide-spread understorey species of *Austromyrtus* (Myrtaceae). *Biodiversity and Conservation* **5**: 881-895
- Walter, K.S. and Gillett, H.J. (eds). 1998. *1997 IUCN Red List of Threatened Plants*. IUCN, Gland, Switzerland and Cambridge, U.K.