Logan City Council

Gossia gonoclada Recovery Plan

2019-2029

LOGAN
CITY COUNCIL

Cover Photo: Glenn Leiper

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Introduction

Executive summary

Gossia gonoclada, (*G. gonoclada*) is known as the 'angle-stemmed myrtle' and is an endangered small tree. This special tree is currently known to only grow naturally within the Logan and Brisbane City areas.

To conserve the angle-stemmed myrtle Logan City Council has developed a recovery plan and have mapped 'Locally Significant *Gossia gonoclada* habitat' in the 2015 Planning Scheme.

The *Gossia gonoclada* Recovery Plan aims to:

- ensure the long-term preservation, viability and conservation of *G. gonoclada* populations in Logan
- contribute to wider efforts to conserve the species in South East Queensland
- develop and support practical and affordable management strategies and actions contributing to the long-term protection and conservation of *G. gonoclada*, and
- promote and help with community engagement in conservation and management actions and projects.

This Recovery Plan recognises that all stakeholders are responsible for the long-term survival of *G. gonoclada*, and the success of this plan depends on the collaborative partnerships.

Introduction

Gossia gonoclada (*G. gonoclada*) known as the 'angle-stemmed myrtle' is a small tree occurring in very limited habitats along rivers and creeks, mainly with riparian rainforest.

It has small, glossy leaves, white flowers and fruits which are soft and black when ripe. The young stems are square in cross section, hence the common name angle-stemmed myrtle.

G. gonoclada is an endangered species listed in both state and federal legislation. The species grows only in the Logan and Brisbane areas. The Logan and Albert River catchments have the majority of known trees. Smaller populations are located in the Brisbane River catchment area.

The national 'Recovery Plan for the angle-stemmed myrtle 2001-2005' (*Gossia gonoclada* formerly, *Austromyrtus gonoclada*), identified nine known populations within Logan and Brisbane. These populations contained 73 individual wild plants. The national recovery plan was vital to increasing the population size and genetic diversity amongst

Angle-stemmed myrtle (*Gossia gonoclada****) flowers (Image provided by: Glenn Leiper)***

the species located along the lower reaches of the Logan and Brisbane Rivers.

In Logan, most naturally occurring trees occur in the Slacks Creek, Tanah Merah, Loganholme and Daisy Hill areas (Figure 1).

Recovery criteria outlined for the angle-stemmed myrtle stated that the wild populations were to be increased to 500 trees from only 73 known original trees (McNeill 2001). Since 2001 a total of 350 new plants have been planted as part of revegetation projects taking the total to 423 trees (T. Taylor, pers.comm., 2016). In Logan, 198 trees were planted as part of those re-vegetation projects. The number of surviving trees is low (71 wild trees and 158 planted trees). This has not fulfilled the aims of the initial recovery program (T. Taylor and J. Napier, pers.comm., 2016; Ecosure 2016).

Some saplings died soon after planting, some died as a result of tree falls, floods in 2013, myrtle rust outbreaks and recent drought (T. Taylor, pers.comm, 2016).

G. gonoclada is subject to many threats, including:

- weeds
- grazing
- recreational disturbance
- changed soil conditions
- arson
- flooding and climate change (including rising sea levels)
- the fungal disease myrtle rust (*Austropuccinia psidii*), and
- intermittent seed production.

Myrtle rust is now expected to be *G. gonoclada*'s greatest threat.

A Logan specific *Gossia gonoclada* Recovery Plan is needed to make sure of the long-term viability of the species by protecting and enhancing natural populations, and promoting research and community involvement.

In Logan the most naturally-occurring trees are in the Slacks Creek, Tanah Merah, Loganholme and Daisy Hill areas (Figure 1).

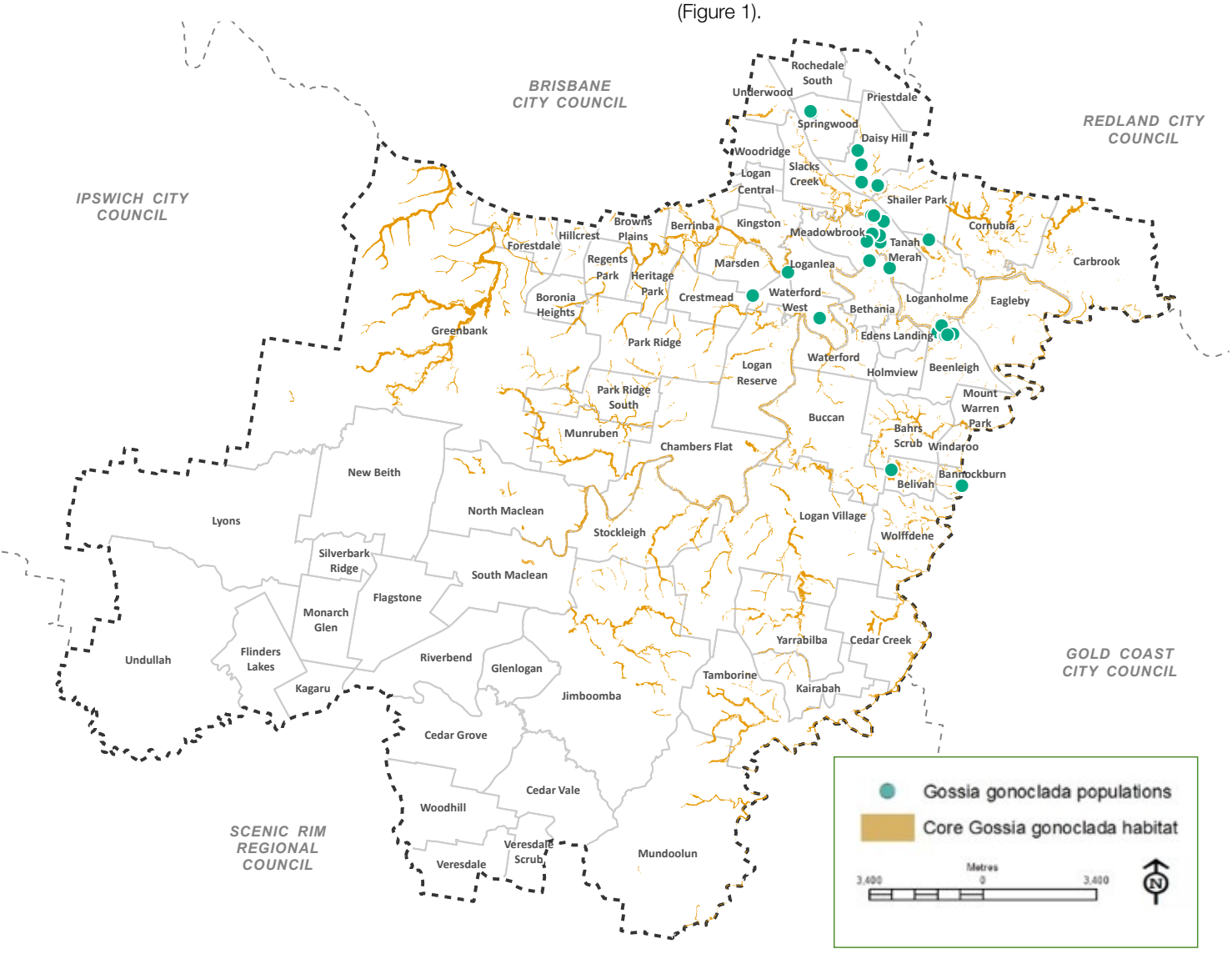

Figure 1. Distribution and core habitat of Gossia gonoclada in Logan city

How did we develop the Recovery Plan?

The *Gossia gonoclada* Recovery Plan (the Recovery Plan) was developed through:

- engagement with experienced consultants and specialists on the '*Gossia gonoclada* expert panel', and
- consultation with Federal and Queensland State government agencies.

The Recovery Plan details the status of the species and threats to its health, reproduction and ecology. The plan also outlines recovery actions to make sure the species' survives in the wild and in cultivation under our management.

The Recovery Plan aims to establish a broad vision to help conserve this threatened species and guide current and future on-ground works to increase populations across Logan.

What you, the community, told us and how we have used it

Our community highly values our bushland and biodiversity. This is reflected through the *Logan Listens: Residents' Survey* results in 2016 and 2018 which recorded bushland and environmental values as highly important.

G. gonoclada is a nationally significant species valued for its rarity, unique habitat values and its contribution to ecological diversity in the city.

We have also undertaken a social media campaign to 'Help us find the endangered angle-stemmed myrtle'. This will help inform the review of the *G. gonoclada* habitat mapping.

Through community consultation we identified the need to remove unsuitable areas and extend the range of habitat mapping to include *G. gonoclada* plants found outside of known areas. The revised habitat map has since been developed using habitat factors determined by an expert panel, followed by ground-truthing for accuracy.

Given the rarity of this species and its uniqueness to Logan, Federal and State governments and academic researchers have a keen interest in protecting this plant. We have developed this Recovery Plan to help with the future management of the species across the City.

Strategic Fit

Integration of existing local, regional, State and Federal programs and plans will make sure the Recovery Plan is effective, efficient and able to achieve outcomes. This Recovery Plan aligns with our long-term corporate outcomes and strategic visions (outlined in Table 1).

The *Gossia gonoclada* Recovery Plan aligns with our 'Green and Renewable' (GR) corporate plan priority. This Plan supports responsible urban planning in Logan to protect and safeguard this threatened species in our natural environment, green spaces and along our waterbodies and waterways.

The implementation of this Recovery Plan will support the delivery of the *Logan River & Wetlands Recovery plan 2014-2024* and outcomes of the *Logan and Albert River visions*.

TABLE 1. STRATEGIC ALIGNMENT OF THE RECOVERY PLAN

STRATEGIC DOCUMENT	PRIORITY AREA	PRIORITY FOCUS
Logan City Council Corporate Plan 2017-2022	Corporate Plan Priority	**GREEN AND RENEWABLE (GR)** GR1.2 Facilitate and support planning, education and capacity building to protect and enhance the natural environment across the city (e.g. corridors, biodiversity, ecosystems, wildlife). **PRIORITY: QUALITY LIFESTYLES (QL)** QL1.5 Facilitate, educate and promote public health and safety and community amenity requirements to maintain healthy and safe places and spaces for residents, businesses and visitors.
Logan 2026 City Directions	Logan City Council City Vision	**THEME 3 – GREEN AND SUSTAINABLE** Visions include the City is, Green and Growing, Acting Responsibly and Becoming an Eco-City
Logan Planning Scheme 2015	Biodiversity areas overlay code	Guides development in the Primary Vegetation Management Area identified on Biodiversity areas overlay map–OM–02.01, designed and located: (a) to: (i) protect the current extent of native vegetation; or (ii) achieve a net gain of native vegetation; (b) to rehabilitate degraded areas with native vegetation. Development in a Locally Significant vegetation area identified on the Biodiversity areas overlay map—OM-02.03 protects *Gossia gonoclada* from encroachment and edge effects.

STRATEGIC DOCUMENT	PRIORITY AREA	PRIORITY FOCUS
Logan Rivers and Wetlands Recovery Plan 2014-2024	SC 1. Strengthening community connection SC 3. Enhancing waterway health and resilience	Our community has increased ownership and capacity to participate in the ongoing stewardship of our local waterways. The health and resilience of our waterway ecosystems has improved
South East Queensland (SEQ) Natural Resource Management (NRM) Plan (2014-2031)	Desired regional outcomes and policies	Targets include maintaining and improving conservation status of native species and maintaining or increasing habitat for priority species.
Planning Act 2016	Queensland State Legislation	Requires local government to prepare planning schemes to manage growth and change in their local area.
Nature Conservation Act 1992 (NC Act) - Nature Conservation (Wildlife Management) Regulation 2006	Queensland State Legislation	All native animals and plants, including *Gossia gonoclada*, are protected under the NC Act, any interference, removal or destruction of a Gossia gonoclada is regulated under the Nature Conservation (Wildlife) Regulation 2006.
Vegetation Management Act 1999 (VM Act)	Queensland State Legislation	Regulates clearing of certain native vegetation.
Australia's Native Vegetation Framework 2012	National framework to guide the ecologically sustainable management of Australia's native vegetation	Goals include increasing the national extent and connectivity of native vegetation and maintaining and improving the condition and function of native vegetation.
National Wildlife Corridors Plan 2012	Australian Government's framework to retain, restore and manage ecological connections in the Australian landscape	Vision: Diverse, connected and healthy landscapes that support and sustain biodiversity, communities and wellbeing.
Recovery Plan for the angle-stemmed myrtle Austromyrtus gonoclada 2001 - 2005	Australian Government Recovery Plan	Original recovery plan in force at the time, legislation provided for the Minister to decide to have a recovery plan. Initial Recovery Plan was vital in increasing numbers and genetic diversity amongst the species in Logan and two other local government areas.
Australian Government - Department of Environment 'Conservation Advice'	Threatened species Scientific Committee	Established under the *Environment Protection and Biodiversity Conservation Act 1999:* Conservation Advice for the *Gossia gonoclada*
Environmental Protection and Biodiversity Act 1999 (EPBC Act)	Australian Government legislation	Provides for the protection of matters of national environmental significance (MNES). The *Gossia gonoclada* is listed as Endangered under the EPBC Act, meaning it is considered a MNES.
Red Hot List for Threatened Plants, University of Queensland, Queensland Herbarium, NSW Office of Environment and Heritage	Threatened Species Recovery Hub under the National Environmental Science Program	*Gossia gonoclada* has been selected as a species to be added to the top 100 priority endangered plants list (Red Hot List), targeting actions for higher conservation attention, creating a National Action Plan for Australia's most imperiled plants.

Queensland

Gossia gonoclada is listed in the *Nature Conservation (Wildlife) Regulation 2006 Part 2 section 7 (Nature Conservation Act 1992)* as endangered wildlife. It is also listed as a medium priority species under the Queensland Government Back on Track species prioritisation framework.

A recovery team was convened by the Queensland Government in December 1995, resulting in a 'Recovery Plan for the angle-stemmed myrtle 2001-2005' (*Austromyrtus gonoclada* Recovery Team 2001).

Since 2005 there has been no formal recovery plan in place.

For more information, please visit Department of Environment and Energy

Commonwealth

Gossia gonoclada was listed as endangered under section 194 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) on 11 July 2000 as *Austromyrtus gonoclada.*

The Federal Government's Threatened Species Scientific Committee endorsed a Conservation Advice document on *Gossia gonoclada*, providing guidance on immediate recovery and threat abatement activities that can be undertaken to ensure the conservation of the species.

For more information, please visit Department of Environment and Energy

International

Gossia gonoclada is on the IUCN Red List of Threatened Plants (Walter & Gillett 1997) but is not currently listed (IUCN 2015).

Vision - looking forward

Gossia gonoclada will be conserved and cared for as a nationally important and locally iconic species.

Outcomes

This Recovery Plan will have multiple social, economic and environmental outcomes.

Social

The Logan community have an increased awareness of *G. gonoclada*, and enhanced stewardship of its conservation and recovery.

Economic

Planning and development take the requirements of *G. gonoclada* into account to protect the species and its habitat.

Environmental

The size of *G. gonoclada* populations increase, the connectivity between them improves and the health of individuals improves so that the resilience of the species is enhanced.

Our Values - Policy position

The *Gossia gonoclada* Recovery Plan aligns with our 'Green and Renewable' (GR) corporate plan priority.

This Recovery Plan will support and lead responsible urban planning in Logan to protect and safe guard this threatened species.

The implementation of this Recovery Plan will support the delivery of the Logan River & Wetlands Recovery plan 2014-2024 and outcomes of the Logan and Albert River visions

This Recovery Plan recognises these values and the integral role we can play in the recovery of this significant endangered species.

Where are we now?

Several factors contribute to the designation of *Gossia gonoclada* as an endangered species:

- *G. gonoclada* has a very limited global distribution centered in Logan and Brisbane. It is confined to a narrow zone on river and creek terraces and lower adjacent slopes, above the mean water level. It is believed to have very specific requirements for access to subsurface soil moisture.
- All natural populations of *G. gonoclada* are small. The largest believed to be only 26 trees in three disjunctive sub-populations. Others are of 1-3 trees. Most have been supplemented by plantings of seedlings or cuttings, with mixed results.
- *G. gonoclada* trees generally do not flower at the same time. This limits exchange of pollen between trees, which is important for maintaining genetic diversity. There may also be genetic or physiological barriers to reproduction. Also, fruits do not always ripen successfully on the tree. The combination of these factors limits the reproductive success of the species.
- *G. gonoclada* is extremely susceptible to an exotic fungal disease called myrtle rust. This disease can restrict shoot growth, impair flowering, and even kill the tree if infection is severe. Our investment into supporting research studies of myrtle rust on Gossia's will help us manage and guide future research, genetics and propagation works to aid in its' recovery.
- *G. gonoclada* grows in flood-prone riparian zones with a very narrow range of elevation. If global temperatures continue to increase and sea-levels rise, this could threaten its' habitat.

G. gonoclada is affected by a number of environmental threats. These threats limit its opportunities to replace itself in existing populations, and to spread to other suitable habitats. Habitat fragmented into smaller areas due to urban development further limits the natural distribution of the species in riparian zones. This also impacts pollination success.

Modelling and ground-truthing of *G. gonoclada* habitat is included in the Logan Planning Scheme 2015 as '*Locally Significant Gossia gonoclada area*'. This mapping will help reintroduce new *Gossia* populations, expand the range of existing populations and identify new plants in the wild.

Where are we going?

The key strategic outcomes of Logan's *Gossia gonoclada* Recovery Plan are to:

- promote and facilitate community involvement in conservation and management projects in Logan
- develop practical and affordable urban management strategies and actions that support long-term protection and conservation in Logan
- ensure the long-term survival, viability and conservation of wild and planted populations in Logan and contribute to wider conservation efforts in South East Queensland.

Threats:

The Australian Government in their Conservation Advice Statement on *G. gonoclada*, list the following threats in order of severity of current risk:

TABLE 2. THREATS IMPACTING *GOSSIA GONOCLADA* IN ORDER OF SEVERITY

THREAT FACTOR	TYPE	EVIDENCE
Disease	Myrtle rust (*Puccinia psidii*)	*G. gonoclada* is extremely susceptible to myrtle rust (Pegg et al., 2014). There is variation in the severity of myrtle rust disease across its distribution. Logan has been severely impacted across 75% of the remaining population, further impacting the reproductive success of the species (T. Taylor, pers. comm. 2016). Initial research has also linked interaction between myrtle rust disease and drought (T. Taylor, pers.comm., 2016).
Land use activities	Habitat loss and degradation	Historical urban expansion has seen *G. gonoclada* habitat lost (McNeill 2001; BCC 2005). Neighbouring development may impact the species through disturbance to drainage / soil water regimes as well as potential consequences of recreation and vandalism. Land use next to sites may increase nutrient loads from run off and livestock grazing can result in soil compaction degrading habitat (BCC 2005). Rubbish dumping and slashing has also caused problems at some sites (McNeill 2001).
Weeds	Habitat degradation and competition	Remnant riparian vine forest within the species distribution is often infested on the edges with hiptage (*Hiptage benghalensis*), cats-claw creeper (*Macfadyena unguis-cati*), balloon vine (*Cardiospermum grandiflorum*) and climbing asparagus (*Asparagus africanus*) (McNeill 2001). Lantana (*Lantana camara*), broad-leafed pepper tree (*Schinus terebinthifolius)*, broad-leaved privet (*Ligustrum lucidum*) and camphor laurel (*Cinnamomum camphora)* can also invade habitat and outcompete the angle- stemmed myrtle (RCC 2014). Additionally, morning glory (*Ipomoea cairica*), coral berry (*Rivina humilis*), Chinese celtis (*Celtis sinensis)*, Brazilian nightshade (*Solanum seaforthianum*), ochna (*Ochna serrulata*), Guinea grass (*Megathyrsus maximus*), para grass (*Brachiaria mutica*), broad leaf paspalum (*Paspalum spp.*), signal grass (*Urochloa decumbens*) and trad (previously wandering jew) (*Tradescantia fluminensis*) affect the survival, growth and reproduction of the species.

Key Areas of Interest

The Recovery Plan and community consultation identified a number of key areas of interest that inform this plan. These include:

- the need for and interest in further community engagement in the conservation management of *G. gonoclada*
- the need for additional planning measures to allow for preservation and extension of *G. gonoclada* habitat and populations
- the prioritisation of research activities to address the long-term viability of *G. gonoclada* in Logan.

The following research topics are recommended to support the ongoing management of *G. gonoclada* in Logan, and will be considered as a program that may include partnerships between:

- Logan City Council
- Brisbane City Council
- universities
- CSIRO (the Commonwealth Scientific and Industrial Research Organisation), and
- community groups and individual experts.

Myrtle rust

Finalisation of a current research project into the impacts of myrtle rust on *G. gonoclada* will generate critical understanding of the threat it has to the species. Relating patterns of resistance to plant genetics, site attributes, cycles of floods and drought and the epidemiology of the disease will allow more targeted management of rust in relation to restoration programs (Ecosure 2017).

Myrtle rust (Puccina psidii) observed on new leaf growth of Gossia gonoclada.

Population genetics

Previous work on population genetics, used proteins (isozymes) as markers to determine general levels of genetic diversity and relationships between *G. gonoclada* and some conspecifics (Shapcott and Playford 1996). Current DNA techniques could be used to investigate further, the relationships within and between sub-populations in the Logan region, and the genetic connections to the Brisbane population and other species in the genus. This can then be used to design controlled pollination trials to maximize seed set and breed resistance to myrtle rust, and to select lines with desired traits by vegetative propagation (Ecosure 2017).

Controlled breeding trials

Reproduction in *G. gonoclada* is sporadic, unpredictable and insufficient to guarantee successful replacement of wild populations. Collection of seed from fruiting trees should continue, but where these trees are isolated, a significant proportion may be self-pollinated and therefore of lower fitness. Research should focus on monitoring of flowering across the Logan and Brisbane populations, and experimental cross-pollinations made using pollen donors from within the same sub-population, from other sub-populations and from trees in the seed orchard (where origins are known). Seed set, seed viability and plant vigour can then be assessed and related to genetics (Ecosure 2017).

Vegetative propagation

Striking cuttings from *G. gonoclada* has had mixed results. Further experimental work on optimal tissues (stem / root, hard / semi-hardened / soft), hormone mix, environmental conditions (light / temperature / humidity) and soil mix may improve strike rates. This may be especially important for generating myrtle rust resistant lines once these have been identified (Ecosure 2017).

Seed storage research

Given the current status of the species and the relatively new threat of myrtle rust, long-term storage of seed should be investigated. As rainforest *Myrtaceae* are generally considered recalcitrant (i.e. do not retain viability using normal storage techniques), professional assistance should be sought from a biobank institute to develop cutting-edge methods to store larger and fleshier rainforest fruits (Sommerville et al. 2016), or from the Australian Seed Bank Partnership program, who already have a program to safeguard susceptible species through seed storage (Australian Seedbank Partnership, 2014).

Our Strategic Objectives

The following strategic outcomes and their respective actions will guide recovery projects and on-ground actions, whilst supporting the Australian Government's intent of the *Gossia gonoclada* Conservation Advice Statement.

Strategic Objective 1

Promote and facilitate community involvement in conservation and management of *G. gonoclada* within the City of Logan

ACTIONS	PERFORMANCE INDICATORS	PRIORITY
1.1 Promote active community involvement in *G. gonoclada* conservation efforts in the City of Logan	Increased participation in restoration activities involving *G. gonoclada*	Medium
1.2 Support the development of network and collaborative partnerships (internal Logan branches, other councils, State Government and NGO's) to assist with Recovery Plan implementation and promote community awareness	Establishment of a network group / partnership *that assists with the recovery of G. gonoclada*	Medium
1.3 Provide relevant landholders with *G. gonoclada* species information and effective management techniques	Improved knowledge of landholders to identify and effectively manage *G. gonoclada*	High
1.4 Deliver a range of community programs to support community stewardship of *G. gonoclada* such as: - Conservation Incentive Partnerships - EnviroGrants - Environmental workshops - River trees	Increased community participation to support conservation actions around *G. gonoclada*	High

Strategic Objective 2

Develop practical and affordable management strategies and actions that support long-term protection and conservation of *G. gonoclada* in Logan

ACTIONS	PERFORMANCE INDICATORS	PRIORITY
2.1 Provide accurate and current information on *G. gonoclada* and its habitat to inform land management, policy, planning and management decisions	Updated *G. gonoclada information incorporated into the* Logan Planning Scheme	High
2.2 Develop and implement appropriate land management practices that support the long-term protection and conservation of *G. gonoclada* on Council owned or managed properties	Enhanced land management practices implemented to protect and conserve *G. gonoclada on Council owned properties*	High
2.3 Continually review and advocate for statutory mechanisms that protect current and potential habitat for *G. gonoclada* on public and private land	Advocacy actions delivered to State and Federal Government agencies	High

Strategic Objective 3

Ensure the long-term viability and conservation of wild and planted *G. gonoclada* populations in Logan and contribute to wider efforts to conserve the species in South East Queensland.

ACTIONS	PERFORMANCE INDICATORS	PRIORITY
3.1 Promote and contribute to the 'web of knowledge' on *G. gonoclada*	Updated *G. gonoclada information made available to the community*	Medium
3.2 Support research into identifying the best options for the management of *G. gonoclada* including myrtle rust risk, propagation conditions, seed storage and other threats to the species	*G. gonoclada* management research projects delivered	Medium
3.3 Support the cultivation and propagation of *G. gonoclada*	*G. gonoclada* cultivation and propagation projects delivered	High
3.4 Support the restoration of *G. gonoclada* habitat	*G. gonoclada* habitat restoration projects delivered	Medium
3.5 Monitor rehabilitation actions and survival rates of *G. gonoclada* populations on Council owned properties	Monitoring data obtained and recorded on *G. gonoclada* populations on Council owned properties	High

Implementation, Evaluation and Review

The Recovery Plan will be implemented through delivery of the identified Strategic actions.

To successfully deliver on this Recovery Plan, it must be supported by an active and engaged community.

The *Gossia gonoclada* Recovery Plan will be reviewed annually to ensure effective implementation. The annual review will include evaluation of each strategic action to quantify progress and to assess its success.

Ongoing monitoring using the national *Monitoring, Evaluating, Reporting and Improvement (MERI)* framework will allow evaluation of performance against strategic objectives and ensure the Recovery Plan is adapted and improved when needed.

TABLE 3. EVALUATION AND REVIEW SCHEDULE FOR THE LIFE OF THE RECOVERY PLAN

REVIEW PROCESS	REVIEW CONSIDERATIONS
Post management assessment	❑ Have management actions been successful?
Annual review and evaluation	❑ Have management actions, subsequent to above, been successful? ❑ Is a community engagement plan needed? ❑ Have community education and conservation actions been completed? ❑ Are ongoing community education and conservation actions progressing?

Acknowledgements

The Logan City Council *Gossia gonoclada* Recovery Plan (2019-2029) has been developed by Logan City Council, guided and informed by Ecosure Pty Ltd and other key stakeholders from government, industry, non-government organisations, research institutions, experts in their field and the wider Logan community.

Questions and more information

For more information about *Gossia gonoclada* (angle-stemmed myrtle) please visit Logan City Council.

If you would like to let us know what you think about the Recovery plan or report sightings, please call us on 07 3412 3412 or email us at environment@logan.qld.gov.au.

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