

## Managing WoNS for better drinking water

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**Summary** Cat's claw creeper (*Macfadyena unguis-cati* Gentry) and Madeira vine (*Anredera cordifolia* Steenis) are ubiquitous weeds found throughout South East Queensland (SEQ).

Previous efforts to manage them, including the release of biological control agents from both a government and community perspective have been predicated on the need to conserve native riparian flora and associated ecological communities. This narrower focus, given the lack of an agricultural or a broader natural resource management imperative has resulted in limited allocation of resources to tackle the growing problem.

A collaboration between the local NRM group, Healthy Land and Water (HLW) and the regional water utility, Seqwater will see a significant increase in riparian vine weed management focusing on the two Weeds of National Significance (WoNS) vines.

The objective is to reduce the density and distribution of the WoNS vines within prioritised catchments. The outcome sought is the preservation of deep rooted native flora which stabilise banks and reduce erosion, filter sediment and nutrients from overland flow, provide competition to other weed tree species and provide shade.

The motivation is the preservation of water quality in stream to avoid the increased cost of and pressure on purification systems delivering drinking water to SEQ. Biodiversity conservation is a bonus.

The change in reasoning from a pure conservation message to one of economic imperative creates interest within the community. This leads to increased participation and is useful in leveraging additional funding to expand efforts beyond current project boundaries to deliver long term sustainable weeding programs.

**Keywords** Community engagement, cat's claw creeper, Madeira vine, Weeds of National Significance, water quality, collaboration, biological control agents.

### INTRODUCTION

Cat's claw creeper and Madeira vine are natives of the tropical Americas. These aggressive climbers were used as ornamental plants in older-style Queensland gardens. They have subsequently escaped and now grow extensively throughout South East Queensland's

(SEQ) creeks and disturbed forested areas (DAF 2018).

Both are declared Weeds of National Significance (WoNS) (WoNS 2018). The vines are capable of completely smothering and eventually killing native riparian vegetation, even growing up and over ancient trees.

Both vine species have a vigorous root and tuber systems. Cat's claw creeper develops underground tubers capable of altering soil chemistry and its habit of growing along the ground acts as a physical barrier to native vegetation seedling recruitment. Madeira vine produces underground and aerial tubers that aid in rapid expansion of weed invasion when disturbed (WoNS 2018).

If left unmanaged, both vines will transform the current natural or marginally modified vegetation structure of riparian zones from creek banks covered by a diversity of medium to large deep-rooted trees and shrubs to potentially a monoculture of prostrate creeper and grass. The result will be a loss of biodiversity but more importantly from a water quality perspective the destabilisation of creek banks and loss of ecological services due to the death of the trees.

Loss of deep tree roots that bind the banks leads to mass erosion and bank slumps during moderate to high water flows resulting in increased sediment loads in stream.

Loss of the filtration mechanism provided by native vegetation means higher volumes of organic material and nutrients arriving at water treatment facilities. This poses a significant threat to drinking water quality increasing cost of purification and impacting on service delivery.

Investing in vine weed management to maintain natural vegetation stability in catchments areas above water treatment off take facilities is a cost-effective manner of reducing the immediate water purification cost, protecting facilities in high water flow events and reducing the need for costlier future expenditure to meet the challenge of decreasing source water quality.

Successful delivery of the projects requires close collaboration with the community. Access to weed infestations is usually through private property requiring landholder cooperation. Communities are empowered to rear and release biological control agents. This is

an excellent engagement tool for the education of the public on weed issues and a viable alternative to physical removal in large inaccessible infestations.

The project investment provided by Seqwater is used by Healthy Land and Water (HLW) as leverage to acquire additional funding from other government and philanthropic sources. This money is in turn used for grants to equip and support community groups, effectively expanding the overall area managed.

#### DISCUSSION

The outcome sought in the delivery of this WoNS vine weed management project is the prevention of escalating costs to purify and deliver safe drinking water by preserving the native vegetation cover within riparian zones and benefiting from the ecological services they provide. Simply put, the investment in vine weed management now will alleviate the need for upgrading of equipment, costly restoration of degraded natural riparian systems or in the worst-case scenario the construction of engineering solutions for erosion control and bank stability.

The escalating costs of differing intervention approaches as determined by Seqwater are demonstrated (Table 1).

**Table 1.** Indicative costs of management.

Action	Indicative costs (\$) <sup>A</sup>
Pre-emptive vine weed management (small scattered infestations)	\$12,400 km <sup>-1</sup>
Managing moderate infestations	\$109,000 km <sup>-1</sup>
Revegetation post riparian vegetation death	\$280,000 km <sup>-1</sup>
Stream bank erosion remediation (engineered solution)	\$2,400,000 km <sup>-1</sup>

<sup>A</sup> Tim Odgers, Seqwater 2018.

Delivery of the project through HLW, the local regional body has several advantages over self-management by Seqwater. HLW has a history of successful community engagement within the SEQ community collaborating with them to deliver many projects of this nature. They are trusted by the community and have a reputation of delivering quality work. Utilising this reputation overcomes resistance from the community to interventions or projects delivered by the water utility as they can be perceived to be an extension of government. HLW can negotiate and gain access to landholders across all land tenures.

Since 2016 Seqwater has invested \$2 M in vine weed management on strategic reaches of creeks delivered through HLW. The areas targeted have been the Stanley River Catchment and the Upper and Mid Brisbane River catchments. The project has managed vine weeds to a secondary follow-up management stage over approximately 60 km of creek bank.

The future investment of \$6 M will see an expansion of the project to include management sites in the Logan and Albert River catchments as well as continuation of works within the Brisbane and Stanley River catchments. Projections are that an additional 100 km of creek length will be managed by 2023. Reaching this target is very dependent on weather and ability to access infestations.

Management of riparian areas is undertaken by contractors chosen through a tendering process. They will undertake primary management within unmanaged areas before completing secondary and tertiary management in areas already under management. This approach will be repeated annually as they progress downstream within designated areas.

Physical control is a staged approach with initial control works focusing on the saving of significant trees and vegetation under direct threat of being killed. This is followed up by progressive retreatment of the re-emerging shoots from underground tubers and tendrils growing at ground level. Delivery over successive growing seasons progressively suppresses weed growth and ultimately eliminates the remainder of the weed from the targeted reach.

In areas that are unlikely to be managed within the scope of this project but pose a direct threat as future seed sources, releases of biological control agents are or will be undertaken to offer the weeds some resistance to future spread.

Under the current project approximately 2000 jewel beetles *Hylaeogena jureceki* Obenberger have been released at the Mid Brisbane management site targeting cat's claw creeper.

Over the next five years to 2023 the biocontrol program will be ramped up to see the release of potentially millions of jewel beetles across the region. The effectiveness of the effort will be monitored and findings used to inform future release initiatives. To achieve this large volume of beetle raising and release, the project will invest in community groups that currently or show interest in raising jewel beetles. This will allow for the expansion of their operations and through bulk purchases and the encouragement of other landholders and land managers to do the same. The objective is to develop a long term sustainable commercial market for the agents.

#### CONCLUSION

The advantage of pre-emptive vine weed management within riparian zones to preserve deep rooted vegetation and benefit from the ecological services they provide is clearly demonstrated (Table 1). Delivering the projects via the local regional body allows for greater community engagement and cooperation with the initiative and leveraging of other funds to develop collaborative projects with community ownership expanding the areas managed. The outcome of the project will strive for a sustainable future water supply curtailing unnecessary increasing purification costs, a more robust natural environment delivering ecological services and an engaged community.

#### REFERENCES

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