Sunshine Coast Council

Invasive Weeds Project 2021 - 2026

Progress Report June 2025

Sunshine Coast COUNCIL

sunshinecoast.qld.gov.au
mail@sunshinecoast.qld.gov.au
07 5475 7272
Locked Bag 72, Sunshine Coast Mail Centre
Qld 4560

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Reference document

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Contents

Overview

Funded through the Environment Levy, the Invasive Weeds Project has three main objectives:

- Undertake weed management at Maleny and Witta demonstration sites
- Explore, trial and validate innovative technology for invasive plant identification, management, monitoring or surveillance
- Sharing information with our community about trial outcomes and opportunities

Figure 1 – Overview of the Invasive Weeds Project

1 Governance

1.1 Invasive Weeds Taskforce

The Invasive Weeds Taskforce meets quarterly with representatives including Queensland state government agencies, Jinibara First Nations, local catchment and advocacy groups, local landholders and Sunshine Coast Council Councillors and staff.

Ten meetings have been held to date, discussing topics such as innovative and alternative technologies, presentations from local catchment groups and organisations, biocontrol facility tours and horticulture property visits.

The most recent meeting focused on the Sunshine Coast Council Biosecurity Plan implementation led by the Environment and Sustainability Policy team. While the focus of the Taskforce will remain on invasive plants, it has transitioned to supporting the implementation of the new Biosecurity Plan.

1.2 Invasive Weeds Project Planning

The Invasive Weeds Project (IWP) has now been implemented for three years. The below sections provide project updates.

2 Demonstration Sites

2.1 Maleny Demonstration Site

Works have been undertaken since November 2021 by Barung Landcare at the Maleny Community Precinct. Nine different weed management treatment blocks were established across the 6.5 ha treatment area as well as creekbank management. Groundwork and monitoring are continuing at this site. To date, 17,450 native plants have been planted within this site, with more planned for the final year of works.

This demonstration site's objective is to provide the community a working example of general weed management techniques. Through this site, broader environmental considerations are included such as working near waterways, erosion and sediment control, use of machinery and working to constraints (e.g. time and cost).

Additional management was also undertaken nearby with the removal of a large stand of slash pines. Restoration of the area has been completed, which has connected with the adjoining restored landscapes.

Image 1 - Maleny demonstration zones

Community information days have been held in May 2023, April and May 2024 and June 2025. Guided tours were provided of the demonstration site, providing an overview of treatment methods, costs, and broader environmental considerations. Information was provided from Council's Land for Wildlife Team, Pest Plant and Education Team and Barung Landcare. These events combined had over 90 attendees.

Community Feedback

"This was a fantastic program and I loved being able to talk to experts. It was wonderful to see the work that had been done at Maleny."

"It was a very informative day seeing the different council efforts made to the areas we walked."

"…The guided walk along the creek and the explanations of the different control site areas, and the work plans for them, made me aware of the huge efforts by staff to control invasive weeds and assist the native flora and fauna to re-establish in the areas. It made me realise the large scale of the undertaking, and the commitment and dedication of the staff managing and assisting….I feel very grateful that the Sunshine Coast has such wonderful projects and staff running them."

Image 2 – Maleny Community Precinct community information day May 2023

Due to previous feedback received by the community, some of the zones were updated to include grass transplanting and solarization of tradescantia.

Additional trials were implemented in 2025 including expanding the grass transplanting, strangler figs for camphor laurel control and native vines planting.

A trial drone mapping exercise was also undertaken for Sagittaria (aquatic weed) distribution within the Obi Obi creek bordering the site. This identified key locations where infestations will grow when conditions are right. Recent infestations have been washed away due to the rainfall received in the catchment.

This information, including monitoring and overview project news, is available on the IWP project webpage.

After June 2026, this site will be handed back to the Natural Areas Management Operations Team to be part of the broader reserve management again.

2.2 Witta Demonstration Site

This site is a Department of Transport and Main Roads (DTMR) road corridor that had large infestations of invasive vine species, woody weeds, and grasses within a 3ha parcel of land. ECOllaboration started managing the on-ground control works at this site in March 2023 and have planted over 16,770 native plants at the site.

This demonstration site's objective is to showcase several contemporary weed management techniques, providing landowners a demonstration on various weed management options for difficult to manage areas (e.g. steep slopes) they may not currently have management tools for. This includes trialing remote machinery, drone herbicide application, hydromulch seeding, encapsulated herbicide capsules, cardboard tree guards, as well as standard treatments. This site is a working example where people can see the changes over a short period of time and what is involved in managing areas with high density weed infestations.

Assessment of the success of each technique at this site is undertaken and communicated. If certain treatments were deemed not successful or suitable for this site, we will explore why that might be.

Initial outcomes that have been communicated to the community include:

- The remotely operated mulcher proved to be highly effective in treatment of woody weeds with mulch being left in situ limiting weed growth. However, the resulting thick layer of debris may limit natural regeneration resulting in domination by weedy herbage in later stages, prior to development of canopy by pioneer species.
- Some areas were still too difficult for the remotely operated mulcher to access, requiring contractors to go back to complete, as well as illegal dumping stopping the mulching head (e.g. tyres and white goods).
- Drone herbicide spraying was expensive for the small areas that were trialed and was identified as not a suitable treatment method for future management at this site. This was due to overhanging vegetation restricting access for the drone in some areas, and the potential for off target impacts on native species was too high.
- Current APVMA permits and the use of drones for chemical application was an additional hurdle, with this treatment still currently being very limited for application in areas zoned as "conservation".
- The use of encapsulated chemicals was difficult on some tree species due to limited accessibility to the tree trunk with the mechanism (multi-stem vs single stem species). From the data collected, the standard drill and fill technique was more effective due to access and time taken.
- The application of blanket mulch post treatment was highly effective in limiting invasive plant regrowth, but may limit natural regeneration of native species in the long term.
- The trial of hydromulch with a sterile cover crop and native grass seed mix was considered a failed method at this site. This could be due to the amount of debris on the ground, ability for grass seeds to germinate, slope and aspect of the site.

Detailed monitoring is taking place at this site, with the 2023-2024 monitoring report available on the IWP project webpage.

The 2024 - 2025 monitoring report is currently being completed and will be uploaded once finalized.

Regular aerial imagery is continuing to be captured to show changes to the site over time. The aerial images show the site before work, after initial weed management and after planting of the site has begun.

Community information days have been held in March 2023, August 2023, August 2024 and August 2025 for 95 attendees. Overall, the event was well received and the nearby residents stating how happy they are with the works being undertaken at this site.

Community Feedback

"Very helpful to see how the council is approaching regen on a difficult site, as we've come from a city background learning from knowledgeable people should shorten our curve."

"Really well-run event with great exchanges between landowners and staff. A great service to our locality and community."

"I believe this to be an excellent test bed for various weed control experiments and comparative testing. I believe Dept Main Roads should take an ongoing interest in the continued management of the site, thereby allowing SCC to direct their energies into projects on SCC owned lands."

Information and images are available on the webpage about this project and is due to be updated to reflect community questions relating to the site.

Image 3 - Drone herbicide

Image 4 - Hydromulching

Image 5 - Trial of alternative tree guards

Maintenance is progressing across the entire site, despite ongoing challenges of terrain (land slips) and weather. There has been an increase in community requests for vine management. All vines present at this site remain a priority, particularly madeira vine and blue morning glory, however one cat's claw creeper plant has been found as well. Management of these species have been difficult given the wet weather being experienced across the region.

The 0.2 ha neighbouring lot and plan to the road corridor has been included to the demonstration site, to assist with managing weed spread and bank erosion. This work is important to manage the spread of invasive vines and minimise re-colonisation within the site in the lead up to site handover. Weed management and planting is the only inclusion approved for SCC to undertake.

Illegal vegetation dumping has also occurred on the stockpad, requiring additional monitoring for new species occurring on site.

There is uncertainty on maintenance and site resilience to re-infestations with current negotiations underway with DTMR.

3 Research Projects

3.1 Broad leaf pepper and pandanus classification and mapping using drone imagery – proof of concept trial

This project used three mapping techniques to identify and map broad leaf pepper (BLP) and pandanus distribution along the Sunshine Coast foreshore bushland reserves. Machine learning and deep learning algorithms with RGB and multispectral imagery were trialled, along with manually classifying on orthomosaic imagery and ground-truthed mapping in a conservation context.

Whilst these technologies are not new and are very successful in the agriculture and horticulture industries, the use of drone mapping (both RGB and multispectral) in combination with machine learning, has limited research in conservation contexts. Due to the complexity of vegetation layers, number of plants with similar green leaves and features, and plant growth forms, this research project aimed to test if this mapping can be used in this environment, and if not, what are those limitations and how can we address them.

Image 6 - Native species - pandanus

Image 7 - Invasive species – broad leaf pepper

Image 8 - Aspect UAV conducting drone flight

For this research project, we wanted to explore for each mapping type what are the:

- Mapping requirements (including data and software integration requirements)
- Cost
- Time
- Usability of outputs produced
- Applications of mapping type
- Constraints of mapping type

Exploring the feasibility of these mapping types for different situations and vegetation complexities provides a guiding framework on future uses of this technology. Our real-world outcome is combining the research of innovative technologies with on ground practical application as well as testing if this technology is possible in our conservation contexts.

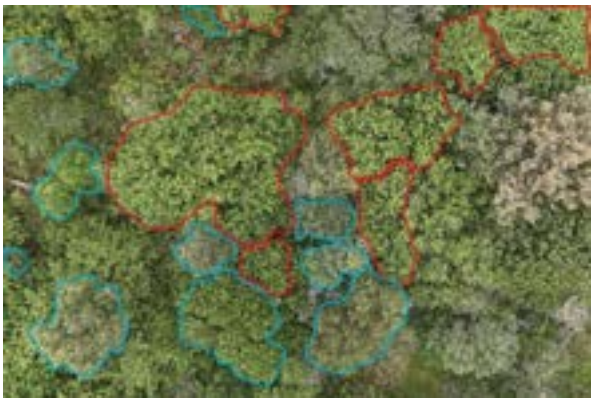


Image 9 - Manual annotation of BLP

Image 10 – predicted model locations of BLP

SCC partnered with Aspect UAV and QUT to undertake this trial, and Southeast Land Repair completed ground-truthed data collection.

The findings of this research have been published in Remote Sensing. Additionally, a comparison table of mapping options and mapping decisions has been created, to accompany a digital illustration on the mapping techniques.

The mapped predictions have been included as a GIS layer to provide the information to the project officers managing the environmental reserves, and to provide estimations of BLP infestations to inform strategic management decisions.

Reports and communication materials can be viewed on the IWP webpage.

3.2 Using drones and AI to map invasive plant species

(AQIRF086-2024RD7)

Building upon the broad leaf pepper proof of concept trial, QUT and SCC were successful in receiving a two-year Advancing Queensland Industry Grant.

This grant will explore the use of machine learning for identification of three new species (cat's claw creeper, madeira vine and camphor laurel), utilising learnings and work completed as part of the pepper mapping project.

The research will explore how identifiable these three species are during two different mapping stages. Each species will receive mapping during a non-flowering period and during a flowering period. This is to investigate how identifiable these species are during each season and provide further parameters on best practice for AI development in conservation contexts.

This research project also includes a deliverable of developing a standardised methodology for surveying and collecting data that fulfills the requirements for the detection and mapping of plant species using aerial imagery.

Image 11 - Project team: Fernando Vanegas Alvarez (QUT), Peter Trotter (Aspect UAV), Angus Warfield (SCC) with support from Julian Galves-Serna (QUT), Belinda Wedlock (SCC) and Josh Hill (SCC)

3.3 Environmental DNA (eDNA) for terrestrial plant detection trial

An initial eDNA trial and assay development was undertaken at the Maleny Community Precinct (MCP) in 2022 to understand the process and possibility of detecting the invasive vine species madeira vine within the Obi Obi Creek system.

Working with EnviroDNA, 12 samples were tested across six sites. Madeira vine eDNA was detected at all sites, however further sampling and validation is required. Additionally, a biodiversity assessment analysis was undertaken detecting 37 vertebrate species including fish, frogs, birds and mammals. This initial report can be read on the IWP webpage.

The next step for this trial was to further validate the eDNA marker that was created, as well as look into creating eDNA markers for cat's claw creeper and dutchman's pipe. Each invasive vine species has the potential to transform our natural environments.

Due to the technical nature of this study, the University of Sunshine Coast (UniSC) was engaged to undertake further investigations within the genetic databases for the three target species. They also investigated the taxonomy and marker validation to confirm if there were already created markers available in Australia.

UniSC created vouchered genetic markers for madeira vine, cat's claw creeper, dutchman's pipe and any similar related species. They also undertook laboratory tests to confirm leaf material from all key species could be detected in water sampling methods to ensure we could detect the species in the catchment scale trial. Additionally, they investigated and tested several different filtration techniques and marker sequences, to identify which combination of these factors provided the most accurate results.

This led to the design of a field trial and validation. It was decided that a good starting question to answer was at what infestation level (low/medium/high) could each of the three target species be identified through eDNA water sampling.

Over 80 sites across the region were assessed to identify suitable sampling locations, taking into consideration safe access, infestation level, land tenure and potential future benefits (e.g. current water quality testing site, environment reserve). From these site assessments, 36 sites had sampling undertaken.

Sampling of the sites was completed in January and February 2025. At each site, five water samples were required for repeatability as part of the experimental design, leading to 180 water samples collected across the region. Support from Council teams was greatly appreciated and enabled cross-council collaboration and knowledge sharing.

Analysis is still being undertaken on the samples.

Image 12 - SCC Officer collecting water sample

Image 13 - Madeira vine plant tissue sample

Image 14 - Madeira vine site assessment

Image 15 - Dutchman's Pipe site assessment

Image 16 - Cat's claw creeper site assessment

Image 17: eDNA sampling process: 1: water sampled collected, 2: water drawn into syringe, 3: water pushed through syringe, 4: water filter with genetic material, 5: preservative added to filter, 6: preservative saturated filter, 7: parafilm secured to seal the preservative, 8: sample labelled, 9: sample and site notes for the University

3.4 Encapsulated herbicide stem injection trial

The herbicide capsule application of encapsulated chemicals included a range of available chemicals, and this trial will firstly explore herbicide capsules of glyphosate and aminopyralid + metsulfuron-methyl on cat's claw creeper.

Similar to already used methods of chemical application (drill and fill), this innovative trial investigates if this new technique's efficacy is the same as our standard treatment. If so, this will provide a chemical option that requires less PPE (no direct contact with chemical, however still encouraged to wear gloves), less potential spill into the environment (the capsule is followed by a dowel plug, ensuring no chemical leaches into the environment), and an easier way to take chemical to site without the need for water tanks and drums of chemical. We also investigate if there are any time efficiencies for either method and compare costs for both treatments.

Our main trial focused on cat's claw creeper at the Upper Mooloolah catchment. This is an established infestation on a very steep slope. Given the access difficulty and ability to take chemical to this site, this trial site is ideal to test this new technique.

We built upon trials already undertaken by UQ and using their technical knowledge to create the trial design. Delays were faced at this site due to weather and availability of contractors to undertake this trial.

Image 18 - Herbicide encapsulation mechanism

Image 19 - Cat's claw creeper vine infestation Upper Mooloolah

Five different treatments were applied in five plots across the landscape. Due to the locations of the plots and the limited number of large vines, each plot had two replications of each treatment (10 vines treated per plot).

The treatments applied included:

- Control (no chemical, just cut the vine to prevent seeding)
- Roundup bioactive (glyphosate)
- Vigilant 2
- Glyphosate (herbicide capsule)
- Aminopyralid+Metsulfuron methyl (herbicide capsule)

Monitoring occurred quarterly, to capture the different seasons and see how the vines respond to climatic changes.

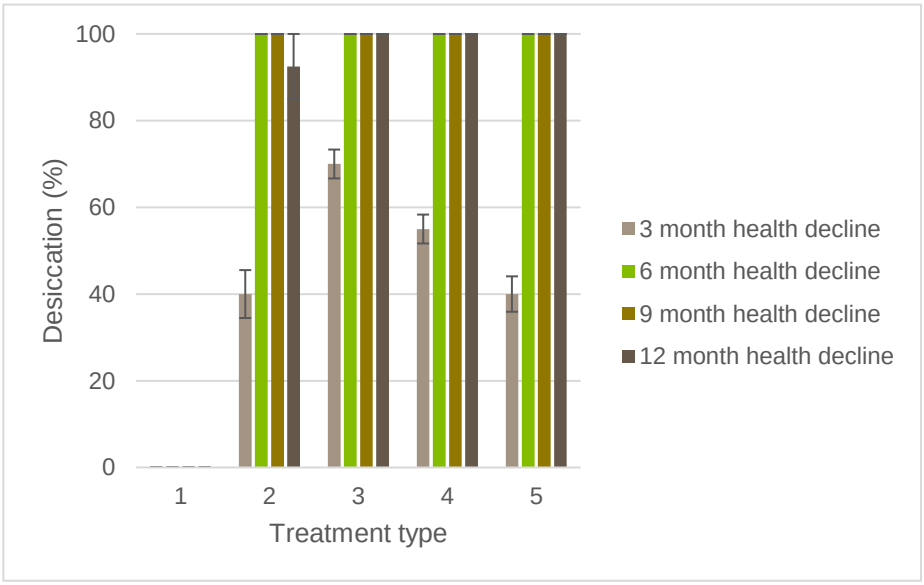
For each monitoring, a plant health code has been assigned to each vine treated. This replicates a UQ trial, allowing further comparison across the two projects.

Plant health data has been analysed as seen in Image 23, with further insights from the data currently being analysed.

Image 20 – Treated cat's claw

Image 21 – Cut stump treatment

Image 22 – Herbicide capsule treatment



TREATMENT AND PLANT HEALTH CODES		
Treatment type	**Code**	**APPLICATION TYPE**
Control	1	Cut stump - no chem
Roundup bioactive (glyphosate)	2	Applied to stump
Vigilant 2	3	Applied to stump
Glyphosate (herbicide capsule)	4	Herbicide capsule
Aminopyralid+Metsulfuron methyl (herbicide capsule)	5	Herbicide capsule
Plant health code	**Code**	**Observed Condition**
Healthy	0 = 0% desiccation	Bright green
Slightly distressed	1 = 25% desiccation	Dull green
Moderately distressed	2 = 50% desiccation	Brown
Severely distressed	3 = 75% desiccation	Black
Dead	4 = 100% desiccation	Desiccated

nage 23 – Vine health data

4 Communication and Engagement

A range of communication and engagement activities have already been undertaken as demonstrated by the list below. Changes to the Invasive Weeds Project webpage and communication material is currently under review. Additionally, this position continues to represent the project in several internal and external functions.

- 18 community information days reaching over 150 community members
    - 11 events at Maleny demonstration site
    - 7 events at Witta demonstration site
- Attendance at other team events (including Garden Expo, Caring for Our Backyard series, Maleny Show, Healthy Places Community Hall event series, Doonan Planting Day)
- Presentation at the PAWS 2023 (oral and poster), Australasian Weeds Conference 2024 (poster display), PAWS 2025 (2 x oral and 2 x poster), International Geoscience and Remote Sensing Symposium 2025 (QUT presentation)
    - PAWS 2023 Proceedings (https://icebergevents.eventsair.com/paws2023/)
    - PAWS 2025 Proceedings (https://icebergevents.eventsair.com/paws-2025/proceedings)
- 11 external presentations (including ECOllaboration trainees, Tafe Queensland, Kirby's Rd Bushcare planting, annual Catchment Workshop, BushCare annual events)
- eDNA project overview at Marine BioBlitz
- Rural Property Landowner Handbook updates
- Two narratives created (one for each of the demonstration sites)
- Two videos created:
    - https://www.youtube.com/watch?v=pVBfrbgBLOI
    - https://www.youtube.com/watch?v=6ode3ukmgzs
- Project StoryMap published: https://storymaps.arcgis.com/stories/a877229ba73c4144bcddf5cdaf5944e2
- Updated external facing webpage: https://www.sunshinecoast.qld.gov.au/environment/invasive-plants-and-animals/invasive-plants/managing-invasive-plants/what-council-is-doing/invasive-weeds-project
- Representation at Australian Weed Remote Sensing Community of Practice
- Organising Committee member for the Pest Animal and Weeds Symposium 2025
- Elected SEQ representative for Invasive Species Queensland Committee (only local government representative)
- Finalist for SCC Employee of the Year 2024
- Finalist for LGMA Awards for Excellence - Innovation category 2025

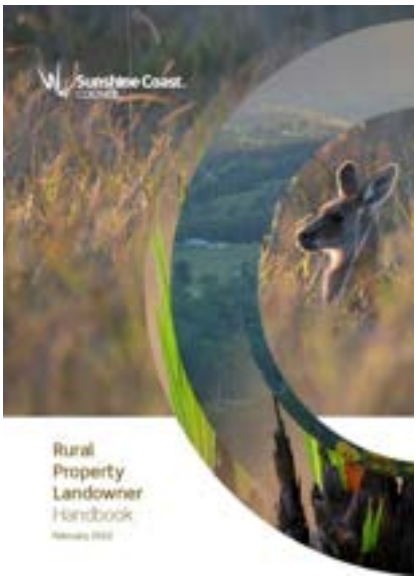


Image 24 – Rural Property Landowner Handbook

Image 25 – Australasian Weeds Conference Poster 2024

Image 26 – Presentation to Tafe students

Image 27 – Bushcare event at Maleny demonstration site 2024

Image 28 –Maleny demonstration community event

Image 29 – Witta demonstration community event 2024

Image 30 – Witta demonstration community event 2024

Image 31 – Pest Animal and Weeds Symposium (PAWS) 2025

Image 32: LGMA Excellence in Innovation Finalist 2025

Image 33: Invasive Weeds Project StoryMap

sunshinecoast.qld.gov.au
mail@sunshinecoast.qld.gov.au
07 5475 7272