Goldsmith Island Weed Management

CASE STUDY

Goldsmith Island is located off the coast of Mackay and is part of the Cumberland Islands group. The islands' feature 370ha of remnant native vegetation, including unmapped patches of well-developed beach scrub (Littoral Rainforest and Coastal Vine Thickets of Eastern Australia). Beach scrub is listed as critically endangered under the EPBC Act 2008 and is threatened by invasive weed species, primarily introduced to the Islands by humans (clothing and camping equipment). These invasive weeds, notably lantana (*Lantana camara*), agave (*Agave sisalana*) and rhoeo/ Moses-in-the-cradle (*Tradescantia spathacea*), regularly outcompete native vegetation and alter fire regimes on the islands.

Due to its isolation and reduced visitation, Goldsmith Island was selected for weed management. The aim of the project was to reduce and eradicate habitat-altering weeds from 30ha along the coast of Goldsmith Island. This would enable native vegetation to re-establish, restoring the island's natural ecosystem, which includes habitat for migratory shorebirds and sea turtle access to preferred nesting spots along the beaches. Ongoing or emerging weeds were also monitored and reported for future weed control.



Figure: Goldsmith Island map. Red dots identify weed management control sites, including Roylen Bay, Farrier Bay and Minnie Hall Bay.

Methodology

The project involved conducting several trips to Goldsmith Island with Steve Fisher leading the on-ground field work between 2018-2023. During his site visits, he would actively treat and remove high priority weed species from Roylen Bay, Farrier Bay and Minnie Hall Bay. Weed species targeted were deemed high priority for removal due to their ability to: alter natural fire regimes, outcompete natives or impact important ecological areas/species of National Environmental Significance.

Target weeds include:

Highest Priority Weed Species	Medium Priority Weed Species
 Lantana (Lantana camara) Agave (Agave sisalana) Stinking passionflower (Passiflora foetida) Seaforth burr (Cenchrus echinatus) Rhoeo/ Moses-in-the-cradle (Tradescantia spathacea) Prickly pear (Opuntia sp.) 	Painted spurge (Euphorbia cyathophora) Cobbler's peg (Bidens Pilosa) Snakeweed (Stachytarpheta sp) Periwinkle (Catharanthus roseus)



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Treatment

Treatment methods included;

- application of selective herbicides through knapsack spraying
- cut and paint technique, where target species are manually cut down then herbicide applied to the stump
- manually removed or hand weeded and placed in plastic bags and transported off the island to prevent germination of new plants from seeds or cuttings.

Biosecurity protocols were also followed to limit transfer of new invasive species to and from the island.

The most beneficial outcome of this project is its connectivity to previous weed control and the length of the program. It takes time and repeated controls to achieve real weed reduction/eradication results. By having a consistent program for the last four years, weed reduction has been effective and natural recruitment of native vegetation is occurring at an exponential rate. Beach scrub is re-entering areas previously inundated with invasive weeds. We are seeing marine turtles successfully nesting in areas previously unsuitable and birdlife taking up residence in the returning littoral rainforest.

~ Steve Fisher



Dense infestation of agave (Agave sisalana) controlled by cutting and painting with herbicide.



Prickly pear (Opuntia sp.) manual removal









Recruitment of native vegetation (right) following reduction of agave at multiple sites at Farrier Bay (left)

There has been a massive reduction in agave, an area that was nearly 90% weed covered. There are now native grasses and littoral rainforest species (silver bean, Sophora tomentosa, black sheoak, Allocasuarina littoralis) recruiting to the foreshore and cycads (Cycas sp.) emerging from underneath the agave coverage.

~ Steve Fisher



Roylen Bay prior to rhoeo removal (left) and after weed removal (right)

Results

Overall weed control has been successful with a significant reduction in weed species in all target areas. The reduction of weed species has allowed natural native revegetation to occur. It has also provided sea turtles access to more nesting sites on the beach that were previously blocked by dense weed infestations.

Ongoing weed control and monitoring is still needed on the island with prickly pear, lantana, agave and rhoeo still a major concern, with some species unlikely to be completely eliminated due to high density numbers. Follow up treatment is required as there is evidence of a heavy seed bank in the soil with juvenile weeds emerging following removal of established individuals.

However, Steve's amazing work and hard effort has

achieved noticeable results within four years. These achievements would not have been possible without hours of hard work from dedicated people like Steve and his team. Potential collaboration with the Department of Environment and Science is being discussed to further reduce invasive weed species on the island.

> By far the two greatest successes with the program is the eradication of prickly pear from areas identified at the start of the program and the reduction of agave allowing beach scrub to re-establish. Sadly, a previously unidentified patch of prickly pear has been discovered in an unsurveyed area and this is now a primary focus to stop spread of this invasive weed.

~ Steve Fisher



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Advice

Rhoeo or Moses-in-the-cradle (*Tradescantia spathacea*) is a garden escapee and originates from South America. It is toxic to native animals and can cause skin irritations to people and pets. Its seeds can last several years in the soil bank waiting for the right conditions.



Rhoeo or Moses-in-the-cradle (Tradescantia spathacea)

Agave (*Agave sisalana*) is a succulent which is able to spread via seed and through individual cuttings of the plants. They often form dense, almost impenetrable thickets that compete with native vegetation, limiting the growth of small shrubs and groundcover species.



Agave (Agave sisalana)



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