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Rainforest Connections 2024

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NSW DCCEW

“What impact is myrtle rust having?”

- *“We haven’t seen it do anything around here”*
- *“Some plants died, but they’ve been replaced by other natives”*

“What can we do about it anyway?”

- *The perception that it’s an uncontrollable threat that can’t be managed.*



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- Myrtle rust is a disease caused by the exotic fungus *Austropuccinia psidii*
- South American origin
- Arrived in Australia in 2010
- Attacks plants in the Myrtaceae family
 - 480 hosts globally
 - 382 native host species
- Multiple strains exist – only the ‘pandemic’ strain occurs in Australia – so far...



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At least 43 species in Australia are thought to be severely affected.

To date 4 species have been listed as 'critically endangered' in NSW due to declines from myrtle rust.

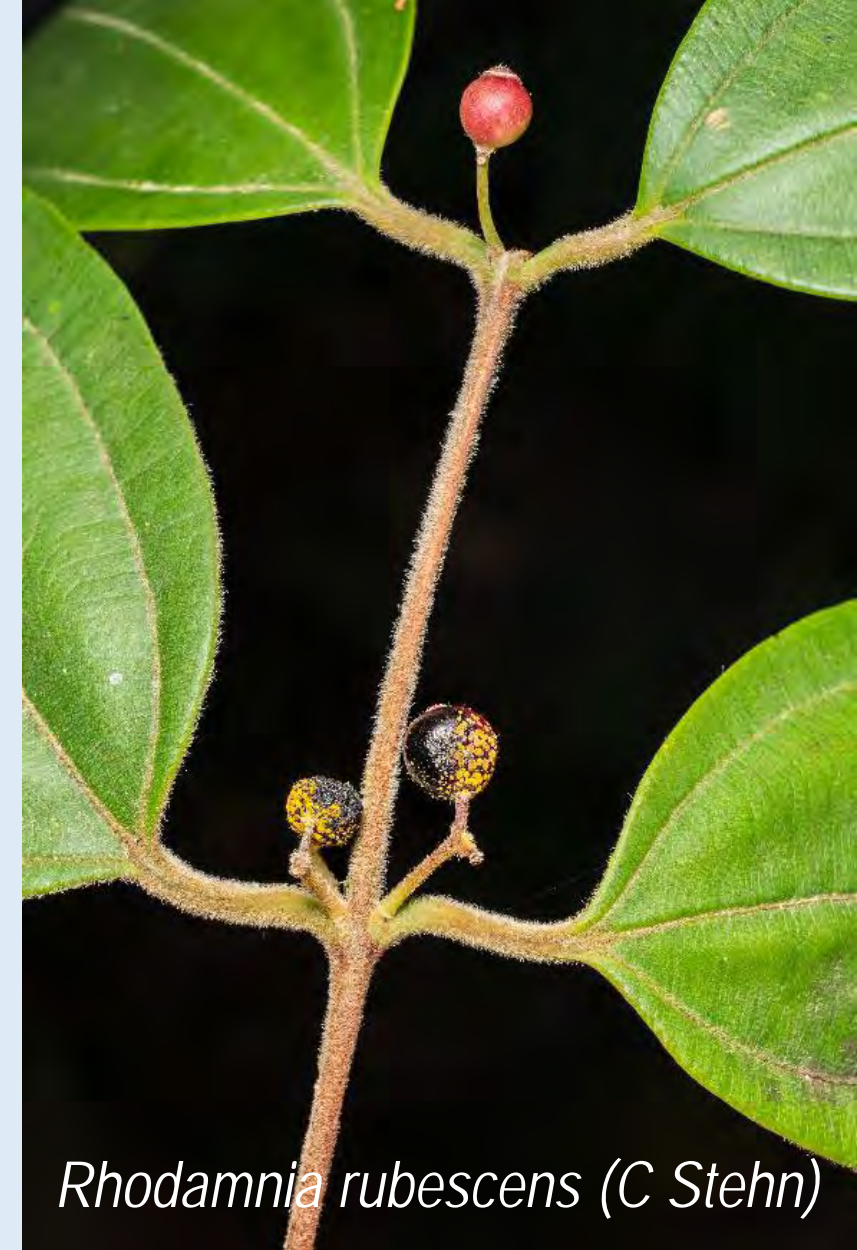
1. *Rhodomyrtus psidioides*
2. *Rhodamnia rubescens*
3. *Rhodamnia maideniana*
4. *Lenwebbia* sp. Main Range



Rhodamnia rubescens (C Stehn)

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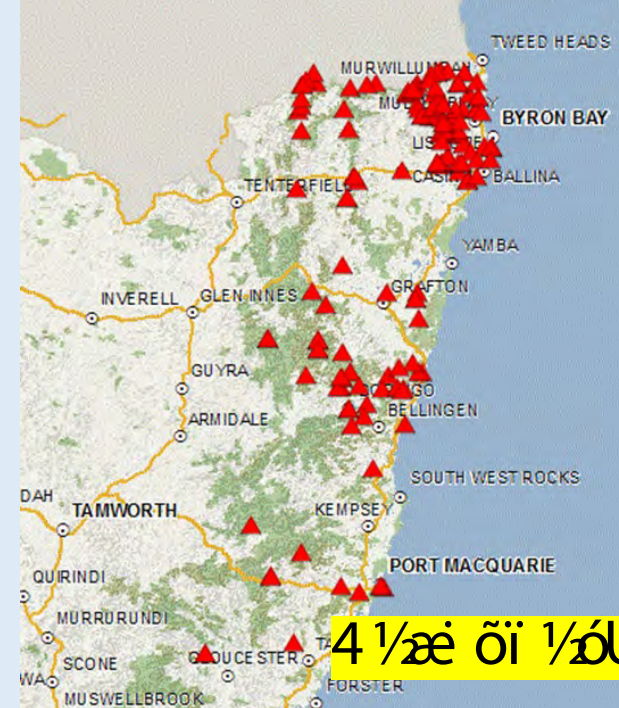
1. All Critically Endangered species are currently suffering rapid declines due to Myrtle Rust.
2. Flowering and fruiting has also been affected by Myrtle Rust and seedling recruitment is thought to be non-existent.
3. Remaining wild plants are likely to disappear in the near future.



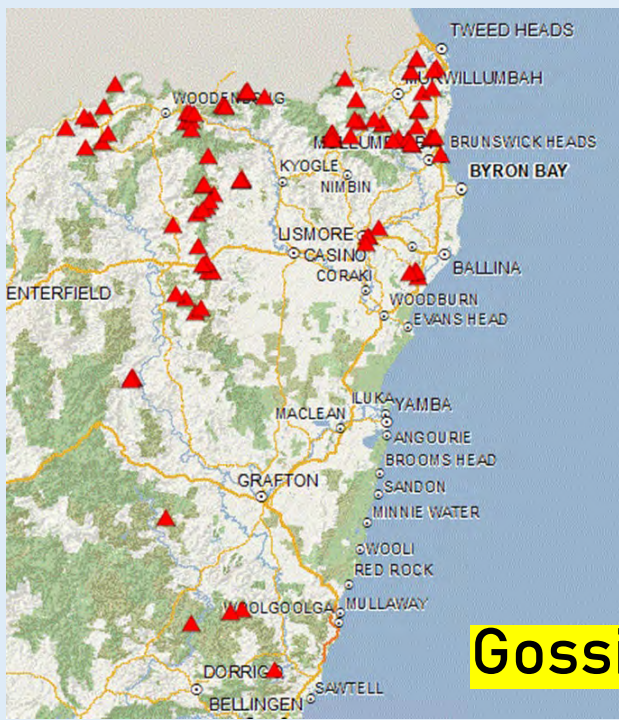
Rhodamnia rubescens (C Stehn)

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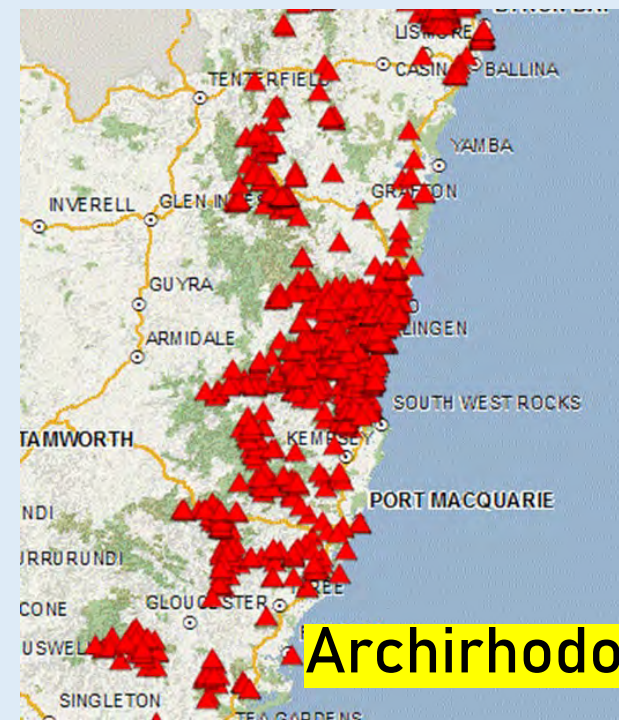
- Expanded assessments of other rapid decline species.
- Studies of community level impacts



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Gossia hillii

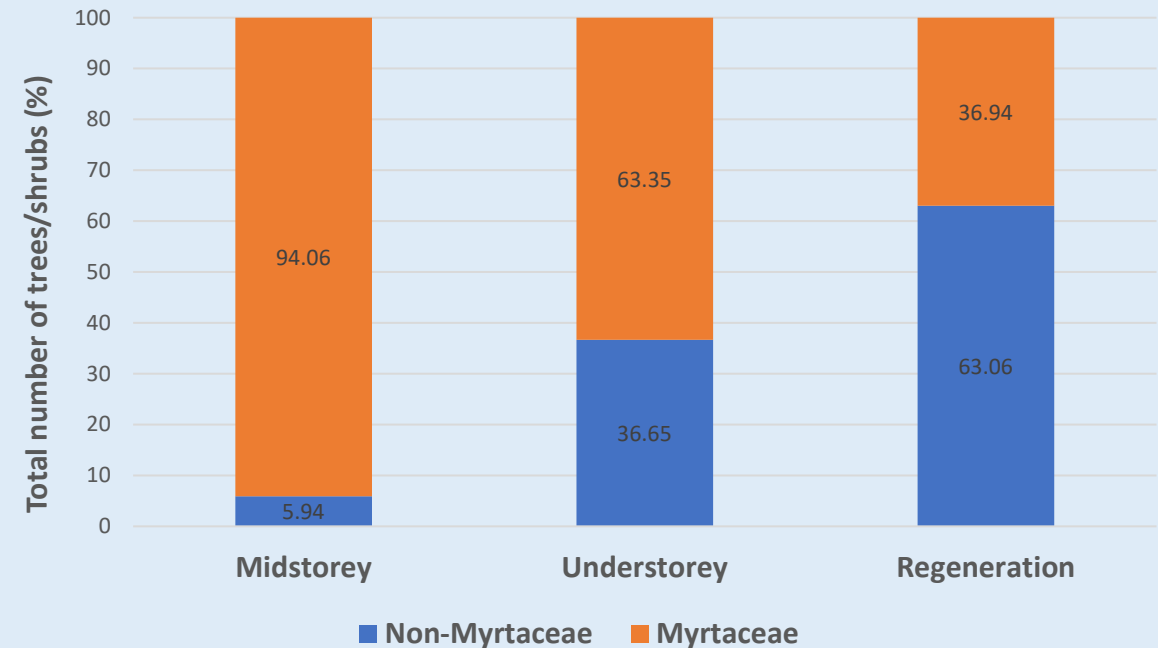


Archirhodomomyrtus beckleri

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Shift is species composition from highly susceptible Myrtaceae species to tolerant and non-host species.

Myrtaceae species	Myrtle rust impact – Tallebudgera Valley	Current Conservation Status (EPBC)
<i>Eucalyptus grandis</i>	Nil impact	Not listed
<i>Lophostemon confertus</i>	Nil impact	Not listed
<i>Acmena smithii</i>	Low-severe - Declining	Not listed
<i>Archirhodomertus beckeri</i>	Severe decline	Not listed
<i>Decaspermum humile</i>	Severe decline - Extinct?	Not listed
<i>Gossia hillii</i>	Severe decline - Extinct?	Not listed
<i>Gossia bidwillii</i>	Nil impact	Not listed
<i>Ptilidostigma glabrum</i>	Nil-minor impact	Not listed
<i>Rhodamnia maideniana</i>	Severe decline	Not listed
<i>Rhodamnia rubescens</i>	Severe decline	Critically Endangered
<i>Rhodomyrtus psidioides</i>	Extinct	Critically Endangered
<i>Syzygium corynanthum</i>	Low-severe decline	Not listed
<i>Syzygium hodgkinsoniae</i>	Moderate-severe decline	Vulnerable
<i>Syzygium moorei</i>	Nil impact	Vulnerable
<i>Syzygium oleosum</i>	Variable impact	Not listed
<i>Syzygium luehmanna</i>	Nil impact	Not listed
<i>Tristaniopsis laurina</i>	Nil-moderate impact	Not listed



Plant community composition, Tallebudgera Valley, Qld (Pegg et al. 2017).

Pegg G, Taylor T, Entwistle P, Guymer G, Giblin F, Carnegie A (2017) Impact of *Austropuccinia psidii* (myrtle rust) on Myrtaceae rich wet sclerophyll forests in south east Queensland. PLoS ONE 12(11)

Stevenson K, Pegg G, Wills J, Herbohn J, Firn J. (2023) Impacts of Myrtle Rust Induced Tree Mortality on Species and Functional Richness within Seedling Communities of a Wet Sclerophyll Forest in Eastern Australia. Plants. 12(10):1970.

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Reassessment of plots surveyed in 2006 for the “Targeted Vegetation Survey of Floodplains and Lower Slopes on the Far North Coast”:

- Undertaken by Lui Weber in 2023.
- Project aimed to re-survey thirty-six plots with high cover scores for known Myrtle Rust susceptible species (*Rhodamnia rubescens*, *R. maideniana*, *Rhodomyrtus psidioides*, *Gossia hillii* and *Archirhodomyrtus beckleri*).
- Severe declines recorded for all target species.
- Significant change in species composition in rainforest communities on coastal metasediments.



Gossia hillii (L Weber)

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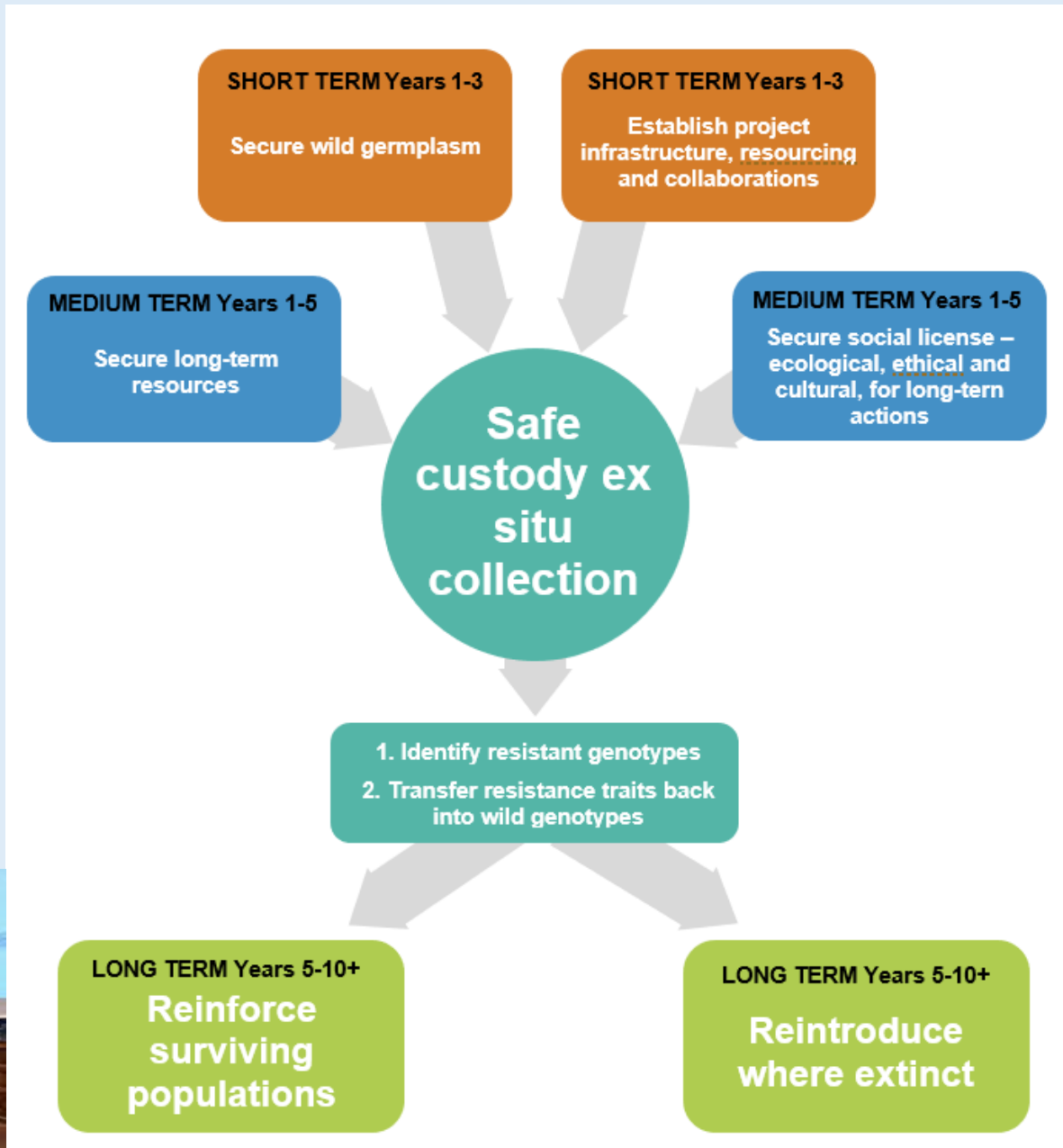
Left: *Archirhodomomyrtus beckleri* die-off Yelgun 2023 (Lui Weber).

Above: *Archirhodomomyrtus beckleri* mid-storey, Tallebudgera Valley 2016 (Geoff Pegg)

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1. Securing wild germplasm

- Seeds, cuttings, root suckers
- Propagate and maintain potted collections
- Replicate and disperse collection

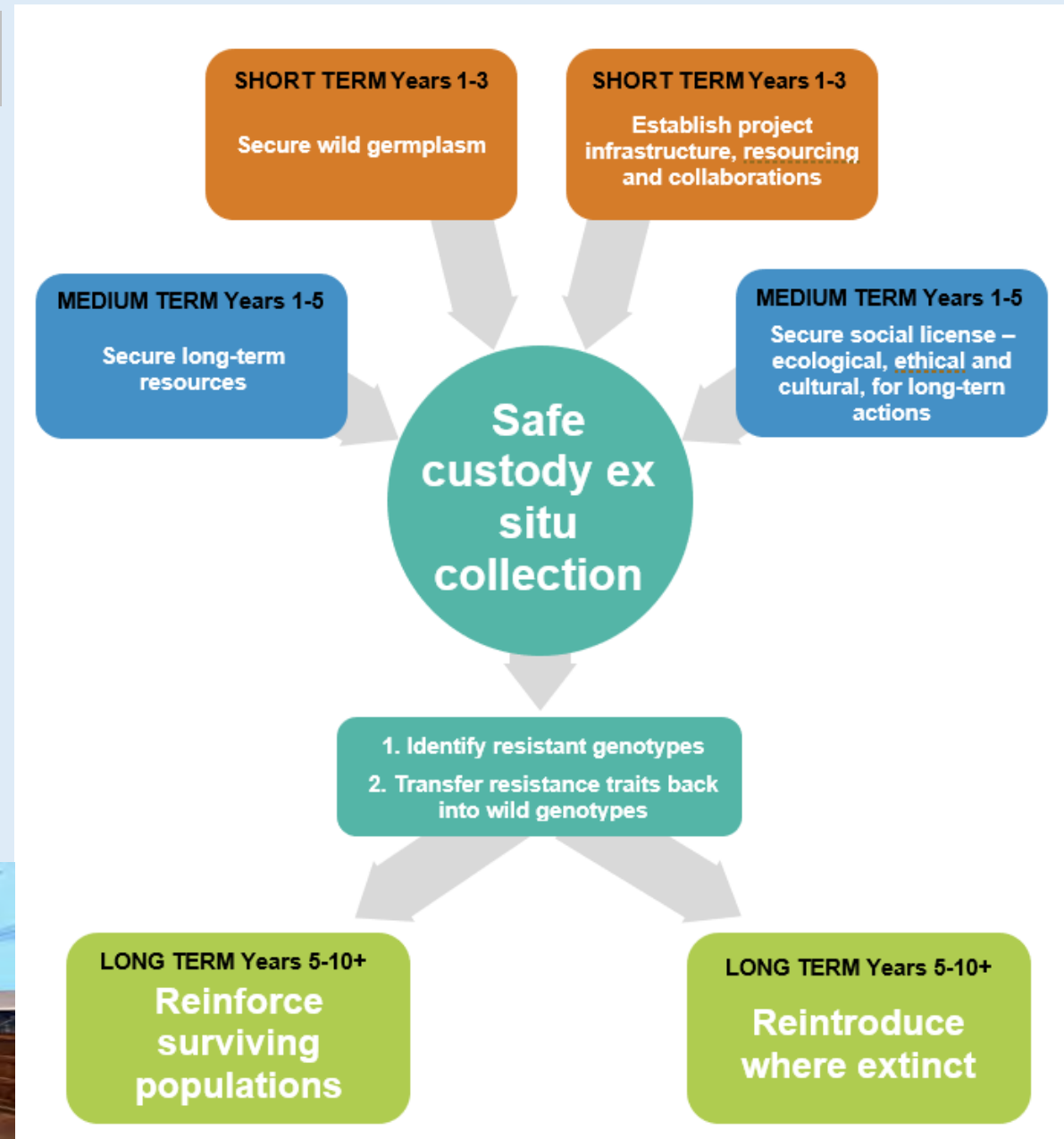


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2. Complete genetics studies

- Understand genetic variability in wild and ex situ populations
- To inform selection of germplasm collections. Useful for:
 - Cryopreservation
 - Collection dispersal
 - Seed orcharding



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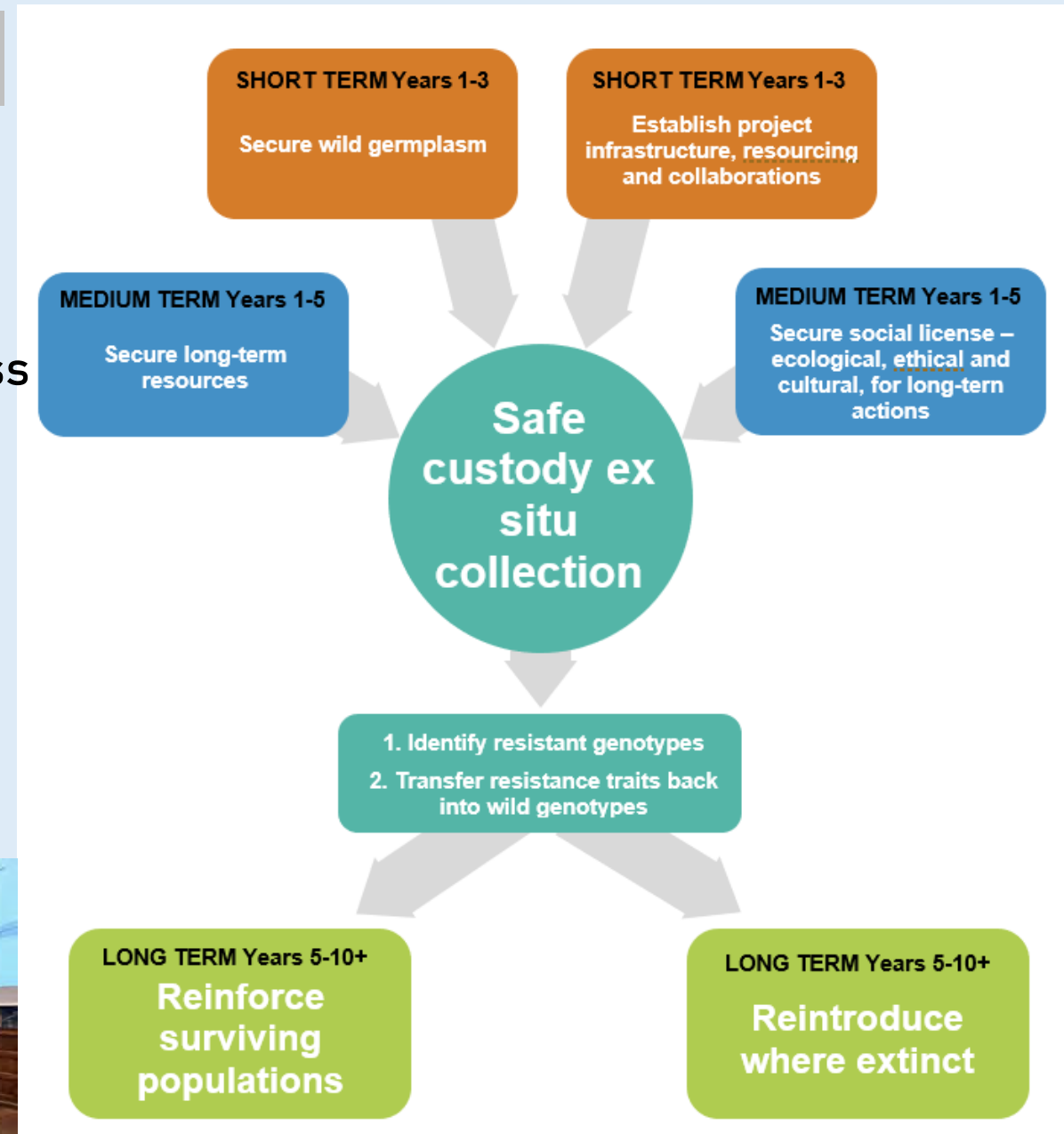
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3. Identify resistant genotypes

- Determine if susceptibility is uniform across the distribution

4. If resistance is present

- Use tree breeding techniques to transfer resistance into wild genotypes



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Species	Adequate ex situ collections	Genetics study completed	Resistance screening	Resistance breeding
<i>Rhodamnia rubescens</i>	Yes	Yes	Started	Started
<i>Rhodomyrtus psidioides</i>	Yes	Yes	No	No
<i>Rhodamnia maideniana</i>	Partial	Yes	No	No
<i>Lenwebbia</i> sp. Main Range	Yes	Yes	No	No



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A biosecurity response is also required

- **Several other strains of MR also occur in Sth America and Sth Africa**
- **Some areas such as Lord Howe Island and SW WA remain myrtle rust free**

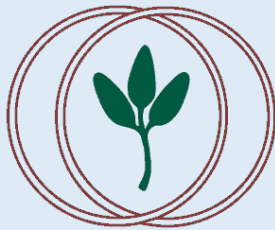
Early detection and a rapid response allowed the Lord Howe Island Board to successfully eradicate Myrtle Rust twice in 2016 and 2023..

These are the only successful eradications of myrtle rust in the world.



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Australian Network for Plant Conservation



Australian Network for
Plant Conservation Inc



<https://www.anpc.asn.au/myrtle-rust/>