

Rare and endemic plants

Norfolk Island's seed-based conservation

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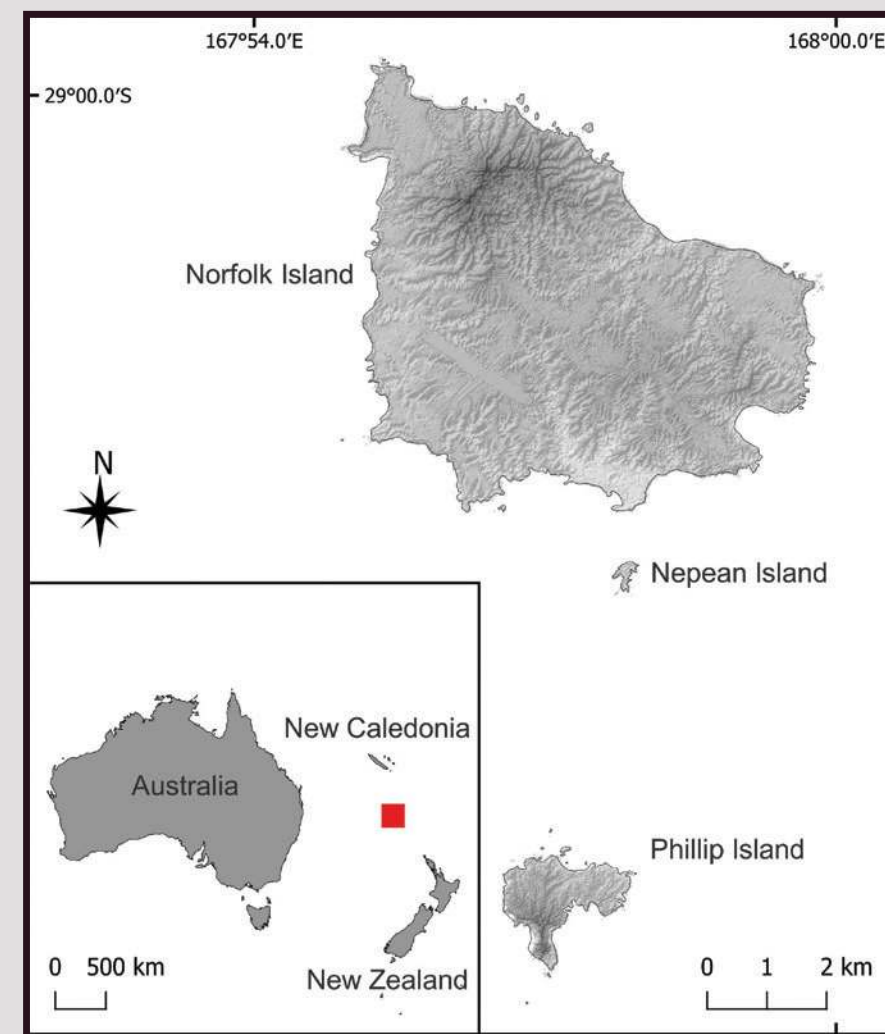
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Abstract

- Norfolk Island is home to diverse plant communities threatened by deforestation, biological invasions, and small endemic population sizes.
- Ex situ* seed banking and *in situ* restoration activities are key to conservation success.
- Both these conservation tools require seed biology and propagation knowledge.

We created a handbook of seed collection, processing and propagation information for 19 native plant species.



Map of the Norfolk Island Group.



Hibiscus insularis



Transplanting seedlings



Myoporum obscurum

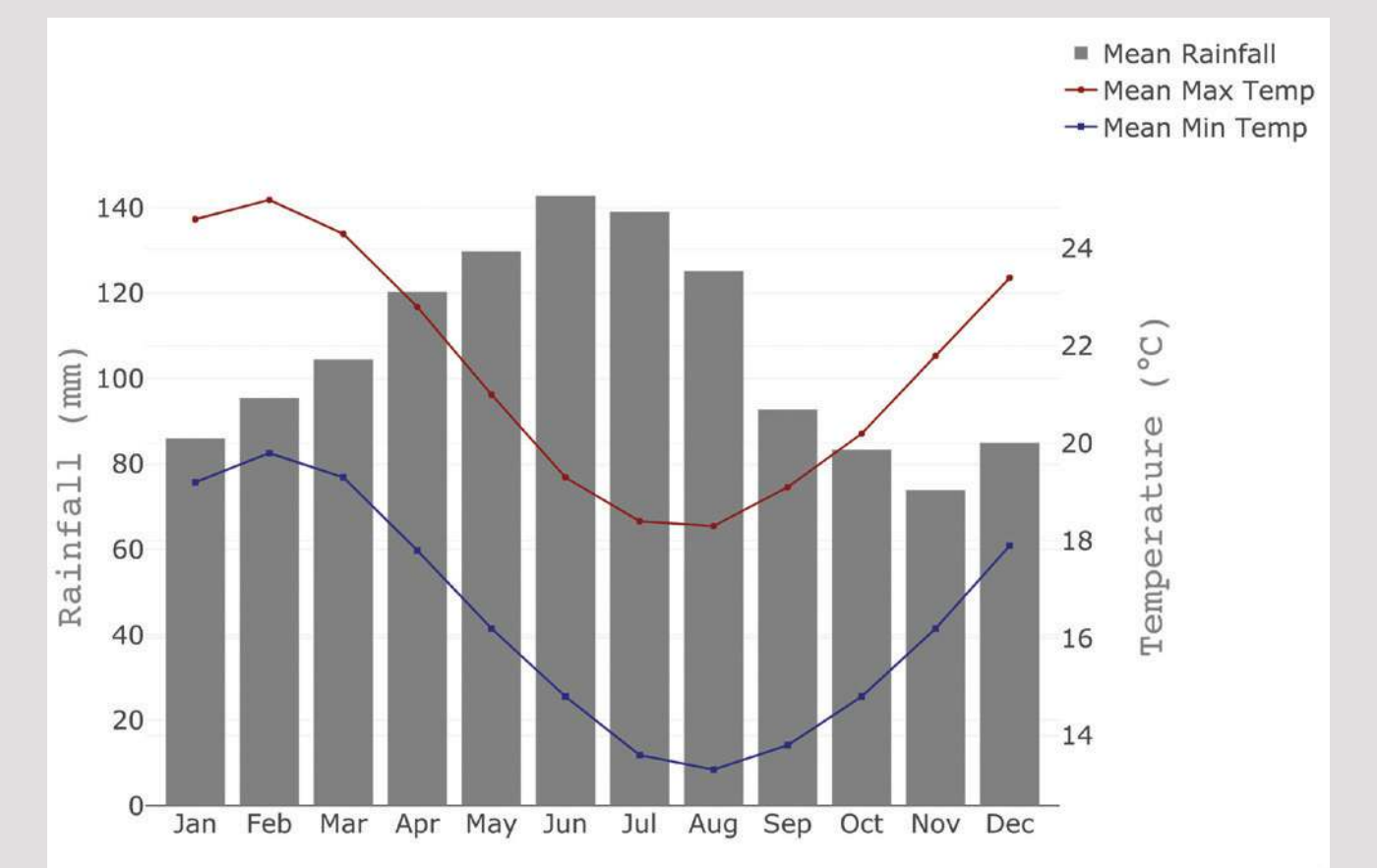
Introduction

Background

- Globally, hundreds of plant species have gone extinct since the 1600s.
- Most recent plant extinctions have occurred on islands.
- Islands have a high proportion of the world's endemic and threatened species.

Norfolk Island

- Subtropical volcanic island in the South Pacific.
- Currently has 33 *Environment Protection and Biodiversity Conservation Act* (EPBC) listed endemic plant species.



Norfolk Island climate data, averaged from 1939–2021, collected from the Australian Government Bureau of Meteorology (accessed Aug 2021)

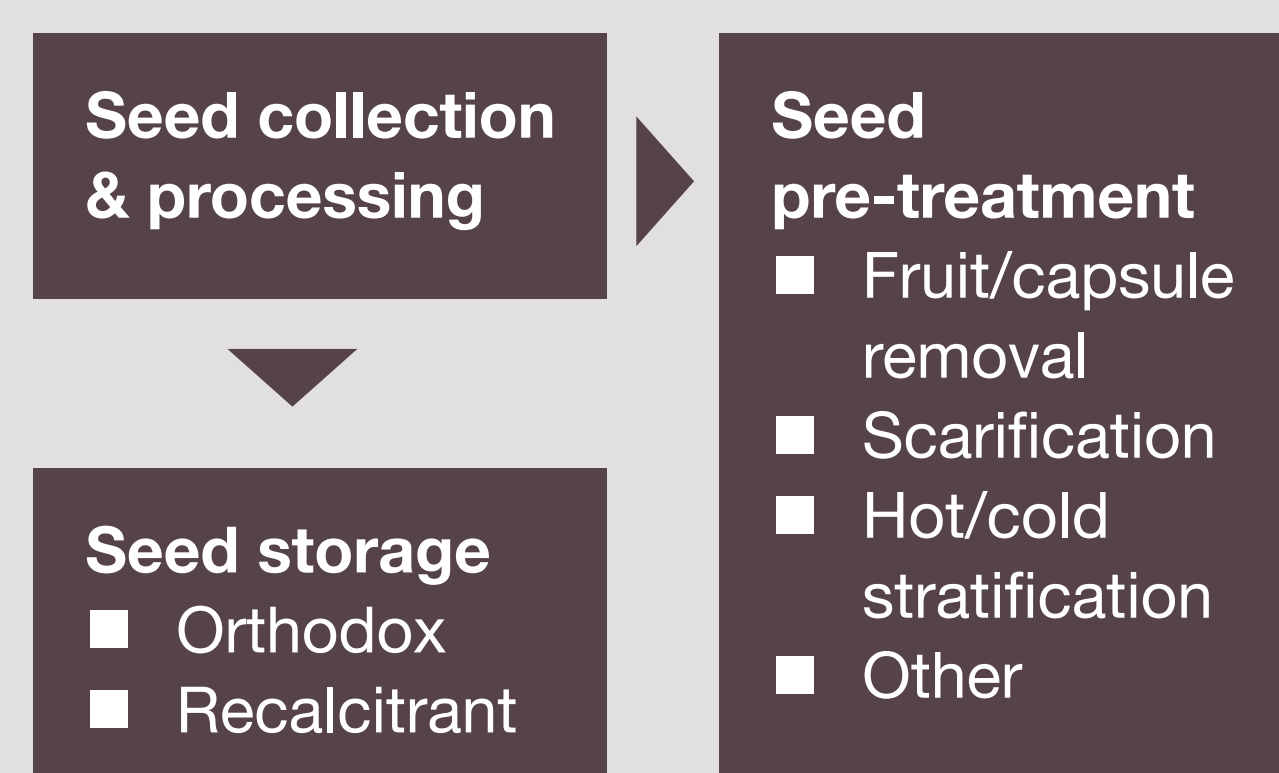
Native vegetation is threatened by habitat loss, invasive plant and animal species, and lost mutualisms.



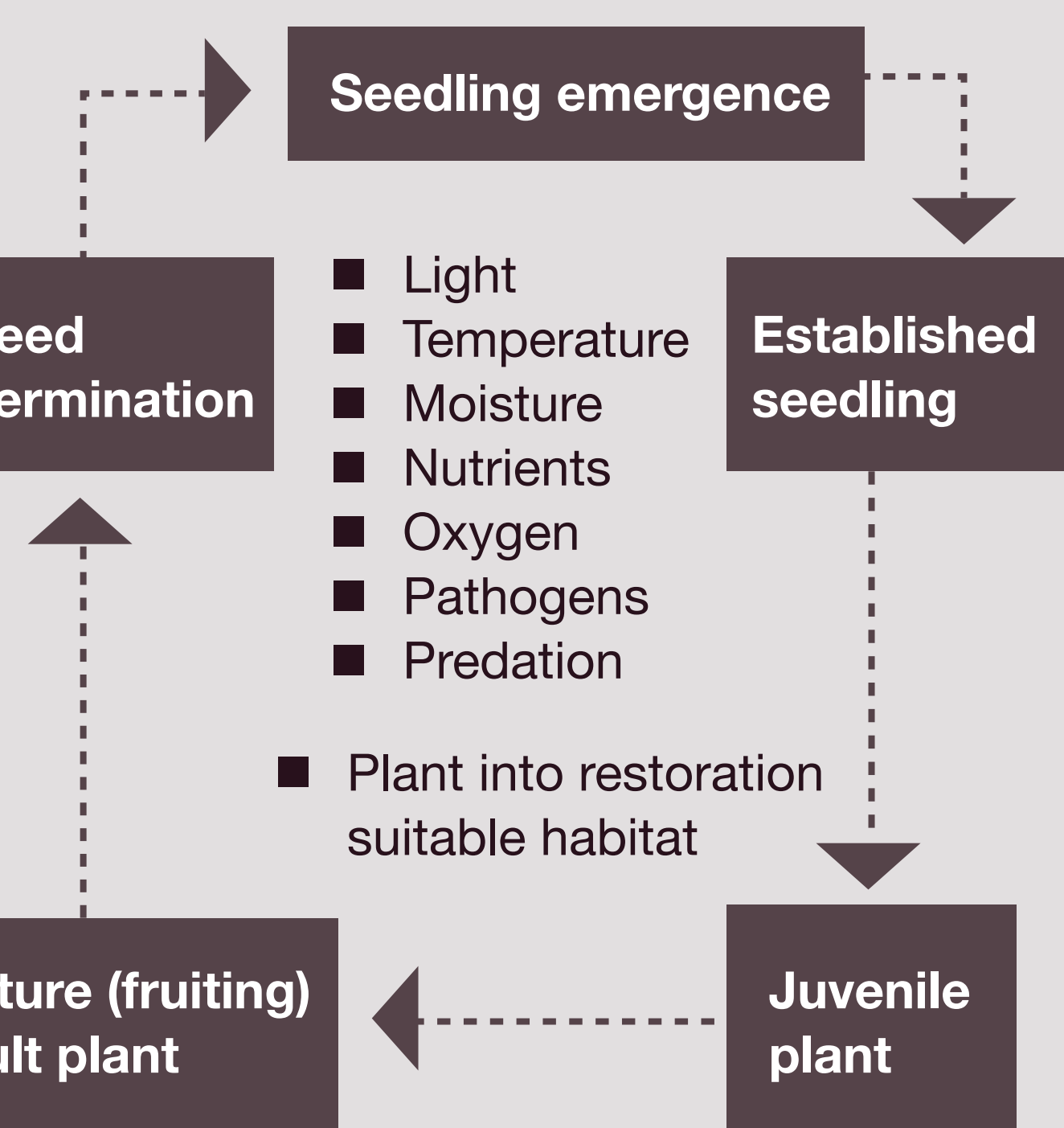
Various plant communities and seed species on Norfolk Island.

Methods

Seed Use & Storage Considerations



Planting & Growth Considerations



The handbook was created using information gathered through field and nursery experiments, local and practitioner knowledge, and literature and database searches.



Ungeria floribunda emerging seedling

Euphorbia norfolkiana seedlings

Baloghia inophylla mature flowering plant

Pittosporum bracteatum capsule/seeds

Results

Wikstroemia australis

Common Name: Kurujung, Kurajong
 Family: Thymelaeaceae
 Status: Critically Endangered
 Range: Endemic to the Norfolk Island Group
 Growth Form: Small tree.
 Plant Description: This small, fast-growing tree can grow up to eight metres tall but is typically shorter. The leaves are smooth, opposite, with serrate margins and are elliptical to a narrow oval shape that tapers at each end (approximately 3–7 cm long, 2–3 cm wide). The tree will often have both yellow and green leaves. It is semi-deciduous, and at times will drop all of its leaves before replacing them, possibly associated with dry conditions. The flowers are longer than they are wide (4–6 mm in length), thin and a yellowish-green colour (Flora of Australia vol. 49: 199–4; Mills, 2010b).
 Fruit/Seed Description: The fruit is ovoid to egg shaped, about 4mm long, and turns dark red when ripe.
 Habitat: Adaptable and hardy. Found in drier areas of the rainforest, open areas, slopes, and dry ridges. Tends to grow well in disturbed areas.
 Light (for plant growth): Moderate to high light levels. Prefers a light gap rather than complete shade.
 Moisture: Tolerant of both dry and moist environments.
 Seed Collection: Bag fruits before they ripen due to rat and insect predation. Collect when fruit is red. Collection times vary, but typically ripe seeds can be found anywhere from winter to summer (often found May–November, January).
 Seed Storage: Orthodox (inferred from related species) (Iltis et al., 2020; Royal Botanic Gardens Kew Seed Information Database, 2021; Sommerville et al., 2021).
 Seed Dormancy: Likely not dormant based on related species (Iltis et al., 2020).
 Seed Propagation: Remove seeds from the fruit before planting. Sow at medium density and cover with a few millimetres of seed raising mix.
 Time to Emergence: Approximately 25–55 days.
 Time to Maturity: Approximately one year.
 Other Information: Norfolk Islanders historically utilised the yellow inner bark of the Kurujung as the raw material for rope that could be used to tie up barbed wire. The same yellow inner bark was also used to make stock whips (Meyers, Buffet, pers. comm. October 2021).

Handbook Information

- One species per page.
- Fruiting and seed collection.
- Optimal seed storage.
- Seed germination, including dormancy alleviation where necessary.

Scientific Name	Common Name	Status	Fruit or Capsule Colour when Ripe	Typical Fruiting Months													
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
<i>Azorella</i>	Azorella	Critically Endangered*	Dark brown														
<i>Freycinetia</i>	Norfolk Island Pine	Unlisted*	Brown														
<i>Bloodwood</i>	Bloodwood	Unlisted*	Dark brown														
<i>Rhodonia australis</i>	Noddy Tree	Critically Endangered*	Brown, green, or cream filaments														
<i>Cyrtocarpus</i>	Whitehead	Unlisted	Blackish-black														
<i>Cyrtocarpus</i>	Coastal Coprosma	Endangered*	Orange														
<i>Cyrtocarpus</i>	Mountain Coprosma	Endangered*	Purple														
<i>Cordyline</i>	Rain, Ti	Vulnerable*	White or blackish-purple														
<i>Flacourtia</i>	Maple	Unlisted	Blackish-black to dark green														
<i>Euphorbia</i>	Norfolk Island Euphorbia	Critically Endangered*	Brown														
<i>Euphorbia</i>	Phillip Island Hibiscus	Critically Endangered*	Brown														
<i>Meyera</i>	Narrow-leaved Meyera	Vulnerable*	Dark greenish-purple														
<i>Meyera</i>	Meyera	Critically Endangered*	Dark greenish-purple														
<i>Meyera</i>	Broad-leaved Meyera	Critically Endangered*	Dark greenish-purple														
<i>Myoporum</i>	Pumukoo	Critically Endangered*	Dark brown														

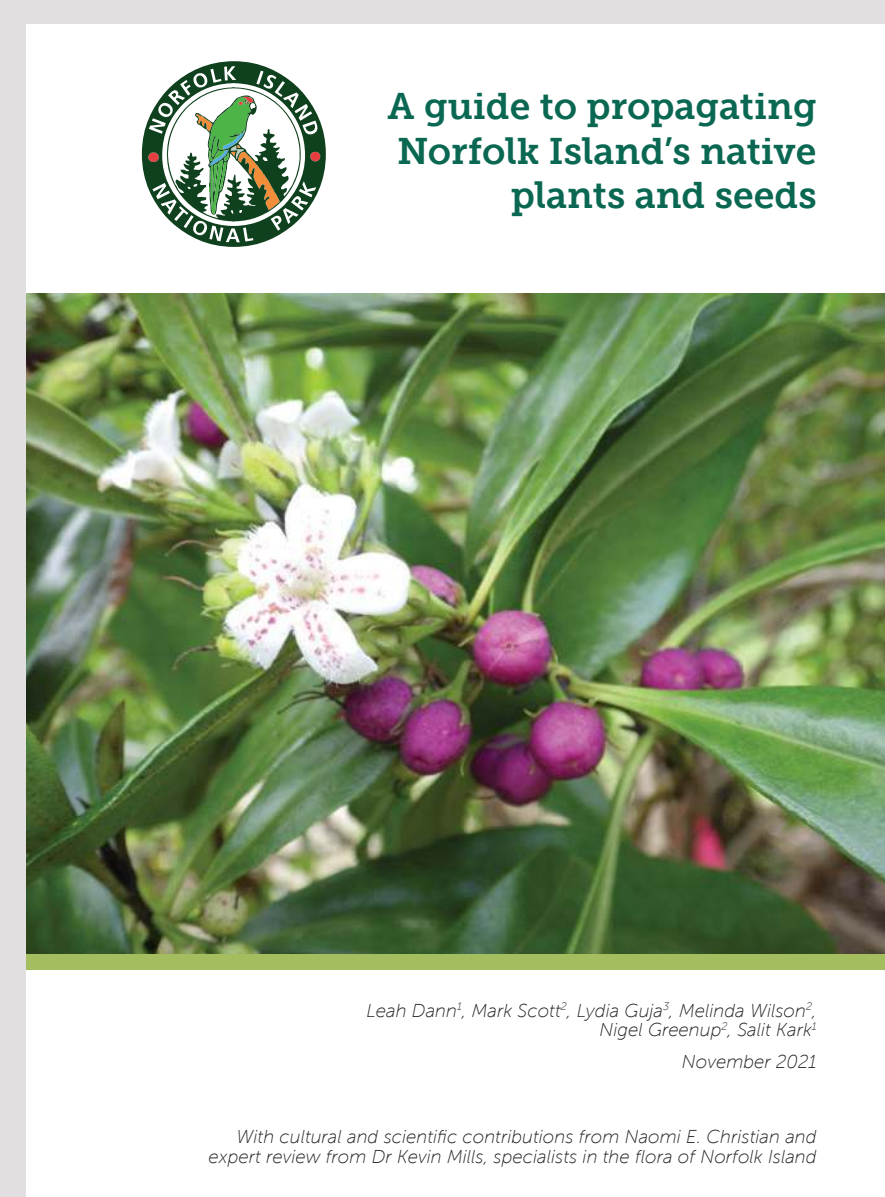
A sample species page from the handbook.

Excerpt of table showing species names, status, fruit colour and typical fruiting months.

Outcomes

The Norfolk Island plant and seed handbook:

- Provides information about seed collection, processing and propagation of some of Norfolk Island's vital plant species.
- Consolidates insights developed by researchers, practitioners, and local gardeners over many years.
- Helps set the direction for further research into the seed ecology of Norfolk Island's endemic species.



Cover of the first edition of the book, released in 2021.

Aims to be a tool that will optimize germination success, improve seedling establishment, and expand seed-based restoration efforts.

Acknowledgments

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