

Swamp Daisy, *Olearia hygrophila* Recovery Action Plan 2025



Queensland
Government

Prepared by: Quandamooka Yoolooburrabee Aboriginal Corporation
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Cover artwork: Tallulah Mewett © The Quandamooka Yoolooburrabee Aboriginal Corporation

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Introduction

The Swamp Daisy Recovery Action Plan has been developed by the Quandamooka Yoolooburrabee Aboriginal Corporation in conjunction with the Queensland Threatened Plant Network as part of the Queensland Department of the Environment, Tourism, Science and Innovation (the department) Threatened Species Program 2020–2040 framework. It provides the strategic management direction for the recovery of the swamp daisy. The plan identifies the key threats impacting on the species and sets out the recovery actions needed to address these threats and facilitate the species recovery on Minjerribah, North Stradbroke Island, Queensland, the only known location for the swamp daisy. The goals, objectives and actions under this plan have been based on the best available information and developed in collaboration with key stakeholders.

The adaptive management approach that underpins this Recovery Action Plan (RAP) ensures that decision-making and the most effective management interventions are used in the recovery effort for the long-term.

Successful implementation of the recovery actions depends on the commitment and cooperation of all relevant stakeholders. The delivery of actions identified in the plan is a shared responsibility and one that is achieved through a collaborative and participatory approach. This document is non-statutory and does not bind any one potential contributor to resourcing or implementing the plan.

This RAP was approved by QYAC and the department and is subject to modification as dictated by new findings, changes in status of the taxon or ecological community, and the completion of recovery actions. Information in this RAP was accurate as of March 2025.

Term and review date

Timeframe: 5 years from 2025 to 2030

Review date: June 2030

For further information on this or other Recovery Action Plans please contact QYAC admin@qyac.com.au or Threatened.Species@des.qld.gov.au.

Acronyms and Abbreviations

ANPC – Australian Network for Plant Conservation

DETSI – Department of the Environment, Tourism, Science and Innovation

DETSI – TSO: Threatened Species Operations

DETSI – QPWS – Queensland Parks and Wildlife Service

DNRMMRRD – Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development

JAMZ – Jan Aldenhoven and Maree Ziirszen

JH – Jason Halford

QTPN – Queensland Threatened Plant Network

QYAC – Quandamooka Yoolooburrabee Aboriginal Corporation

RCC – Redland City Council

RE – Regional Ecosystem

Summary

Species

- The swamp daisy, water daisy (*Olearia hygrophila*)

Conservation Status

- Queensland *Nature Conservation Act 1992*: Critically Endangered
- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC): Endangered
- Taxon status under the International Union for Conservation of Nature (IUCN) Red List of Threatened Species: Yet to be determined.

Current Population and Distribution

- The swamp daisy is currently known only from a single population at two sites in the northern wetlands of Minjerribah/North Stradbroke Island. In 2024, the known population was six individual plants, three at the Myora site and three at the Cooroon Cooroonpah Creek site.

Key Threats

- Small restricted population
- Inappropriate fire regimes
- Ground water availability – water extraction
- Climate change – marine incursion/sea level rise/rise in water table
- Climate change – fire and drought
- Accidental trampling – people and animals (domestic, feral and native)
- Weed incursion
- Groundwater pollution – release of high nutrient loads into groundwater, changes in pH, changes in chemical composition.
- Mining legacies

Vision Statement

By 2035 the swamp daisy continues to persist in the wild and there is a better understanding of its ecological requirements. Monitoring programs indicate population growth on 2024 levels. The swamp daisy is found in multiple sites on Minjerribah including within protected areas and areas above expected sea level rise. Collaborative partnerships between QYAC, the community, government agencies, local council, research institutes and conservation organisations continue to drive recovery strategies that ensure the long-term survival of the swamp daisy and its habitat.

Goals

There are six goals presented in the following section, each with specific objectives and actions that are practical and have operational steps toward achieving the long-term vision. These goals are for the life of the plan.

The six goals are:

1. Reduce the threat of small population size and limited extent of occurrence to improve swamp daisy survival in the wild.
2. Investigate and implement appropriate fire management strategies in key swamp daisy habitat.
3. Understand and protect the hydrological requirements of the swamp daisy and investigate the impacts of sea level rise.
4. Manage weeds, trampling and other anthropogenic impacts on swamp daisy habitat.
5. Increase the area of protected swamp daisy habitat and the status of protection, particularly for locations known to support populations now, in the past and any new areas appearing.
6. Stakeholders and community members are engaged in and contribute to the recovery of the swamp daisy.

The Quandamooka People

The swamp daisy occurs on the lands of the Quandamooka People.

The Quandamooka Yoolooburrabee Aboriginal Corporation (QYAC) Registered Native Title Body Corporate (RNTBC) operates and functions on the land of the Quandamooka People. QYAC was established in 2011 under the Native Title Act 1993 as the Prescribed Body Corporate to manage the rights on behalf of all Quandamooka Native Title Holders.

QYAC'S VISION

Quandamooka People caring for Country in a viable economy using traditional and modern knowledge.

Caring for Country heals us both -
HEAL COUNTRY, HEAL PEOPLE.

Being a Quandamooka person means caring for Quandamooka Country. As we care for our Country, we heal the spirit that lives in ourselves and in our Country.

Our knowledge of Country lives in ourselves and in our Country. Our Elders help us to learn and connect with Quandamooka knowledge –

**Traditional AND Modern knowledge.
(QYAC, 2022).**

For over 40,000 years Quandamooka People have continually maintained customs and cultural practices with a focus of managing and preserving resources on their country (QYAC, 2023). Protection and management of the swamp daisy is important for Quandamooka People.

We recognise Minjerribah and Mulgumpin as sanctuaries to protect Quandamooka cultural, ecological and biodiversity values as reflected in the Management Plan for Naree Budjong Djara (State of Queensland 2020) and future Management Plan for Gheebulum Kunungai (Moreton Island) National Park & Recreation Area and articulated in vision statements by the Quandamooka Yoolooburrabee Aboriginal Corporation (QYAC Strategic Plan 2022-2026).

The Management Plan for Naree Budjong Djara states: *coastal swamps and wetlands are associated with sensitive cultural sites, water places and story places, and are of high cultural and spiritual importance to Quandamooka People*

Wetlands are recognised as having key values including being home to the swamp daisy.



Swamp daisy *Olearia hygrophila* Photo: © Glenn Leiper

Context

Species Information

The swamp daisy *Olearia hygrophila* is a perennial woody shrub with white flowers and lax habit endemic to a few wetlands on Minjerribah.

The ecology and biology of the species is not well understood. More research and field surveys are paramount to elucidate the species biology and range. Current and past distribution is restricted to narrow bands of suitable micro-habitat/s within the northern coastal swamps of Minjerribah. The known population in 2024 was 6 individuals across two sites. The highest number of individuals recorded previously was approximately 129 (Sparshott and Bostock 1993).

Conservation Status

Legislation	Conservation status
<i>Nature Conservation Act 1992</i>	Critically endangered
<i>Environment Protection and Biodiversity Conservation Act 1999</i>	Endangered

The swamp daisy has been assessed as threatened (Critically Endangered) in Queensland under the *Nature Conservation Act 1992*.

QYAC would like to acknowledge that most of the information in the following sections from “Taxonomy and Description” up to “Table 1” are taken directly from “Nomination to change the conservation class of *Olearia hygrophila* under the *Queensland Nature Conservation Act 1992*” by Jason Halford, 2023 with a few minor changes and updates.

Taxonomy and Description

The swamp daisy was first collected by Allan Cunningham, Charles Fraser and Captain Patrick Logan in 1828. The following description is by Stanley and Ross (1986):

“Shrub up to ca. 2 m tall with slender stems, sparsely stellate tomentose. Leaves alternate, petioles 2-5 mm long, blades linear elliptic, apex acuminate, base attenuate, margin entire or with a few teeth, recurved, 1.5-7 cm × 0.15-0.6 cm, glabrous or almost so above, stellate tomentose below. Heads in large corymbose panicles, involucre broadly turbinate, ca. 1 cm broad, rays white, 8-10 mm long, disc florets yellow. Achenes ca. 3 mm long, glabrous, pappus ca. 5 mm long.”

A more comprehensive description can be found in Messina et al. (2014).

The crown is often sparse and with its lax habit, the species is inconspicuous amongst other vegetation and as such, the plant can be easily overlooked when not in flower (DCCEEW 2008; Messina et al. 2014; J. Halford pers. obs. 2023). The species is morphologically similar to *Olearia nernstii* (Messina et al. 2014) but differs mostly in its leaf morphology, its sprawling habit and its habitat preference. The nearest historical record for *Olearia nernstii* with an accurate locality description is Wellington Point (J. Wedd AQ AQ0249819), approx. 20 km from Myora. No other species of *Olearia* has been recorded on Minjerribah.

The swamp daisy is endemic to Minjerribah (AVH 2023; HERBRECS 2023).

Biology and Ecology

The swamp daisy's lifespan is unknown but based on observation, is estimated at 3-7 years depending on environmental conditions. Observations post-fire indicate the species reaches sexual maturity at 2 years. The life of the seed bank is unknown. Flowers and fruits have been recorded from July to December. Pollination is probably limited to short-range pollinating insects with a foraging range of < 2 km (e.g. Rands and Whitney 2011; Smith et al. 2016). Seed is dispersed by wind, facilitated by a ring of pappus (silky hairs) at the apex of the acene (fruiting body).

Fire will most likely kill individuals (Sparshott and Bostock 1993) and hot fires in dry times that burn through the peat layer will likely cause substantial damage to the soil seed bank. Low intensity fires, however, may stimulate germination by increasing available light in the ground layer. Plants were observed at Cooroon Cooroonpah Creek within the first few years after the area was burnt (J. Halford pers. obs.). Simulated experiments *ex situ* may shed more light on the effects of fire on germination of the swamp daisy.

It appears, based on observation and historic herbarium records, that the Myora Conservation Park (C.P.) site probably offers the best environmental conditions and is of adequate size for consistently sustaining a population. It is regularly saturated, is larger in area of suitable habitat than Cooroon Cooroonpah Creek and is naturally more open in structure than other locations (such as Flinders Swamp), even in the absence of fire. This may possibly be due to the degree of saturation limiting the growth and survival of plants less tolerant of these conditions.

By comparison, the site at the Cooroon Cooroonpah Creek is a small, narrow strip of riparian vegetation within close proximity to a spring-fed creek, with individuals occupying an area < 100 m² (J. Halford pers. obs.).

The site at Flinders Swamp is not permanently saturated by groundwater and currently has a very dense shrub layer mostly dominated by the fern *Todea barbara*. It is also likely the sites near Myora Springs (north of Myora C.P.) are not permanently inundated with groundwater, or the areas that are, are too small to sustain a permanent population. These sites are likely ephemeral in nature where favourable environmental conditions only periodically enable germination, short-term persistence of the species and replenishment of the soil seed bank. It is also possible that the species has gone extinct at these sites.

The preferred range of saturation for the swamp daisy is unknown and requires further research. Just as dry conditions can be unsuitable, too much water may be problematic.

Historically, the species has been considered extremely rare (Sparshott and Bostock 1993; Messina et al. 2014) and collection events have been sporadic (HERBRECS 2023). This absence in observation maybe a result of the difficulties in observing plants in the field, particularly when sterile (DCCEEW 2008; Messina et al. 2014; J. Halford pers. obs.). It may also point to a lack of persistence in extant individuals over time, supporting the idea of a fluctuating population in response to environmental conditions. Sparshott and Bostock (1993) suggest the possibility of transitory populations originating from wind-dispersed seed settling on recently burnt grounds. This would require a large volume of seed to be dispersed so that some may land by chance in distant suitable habitat. It is also possible the species relies upon a healthy dormant

seed bank. Whilst populations may fluctuate in response to environmental conditions such as fire, water levels, competition and weed invasion, it remains to be seen whether a viable seed bank still exists at Flinders Swamp and the Myora Springs sites where the species has been previously observed.

The establishment of an ongoing monitoring program and potentially *ex situ* experimentation is required to fully understand this species population dynamics in response to environmental conditions.

Species Population and Distribution

The current trend of the population is one of decline. In 1993 Sparshott and Bostock estimated the population at less than 150 individuals across 5 sites. Surveys carried out by QYAC, JAMZ and JH at Myora and Cooroon Cooroonpah Creek in 2021 recorded a total of 50+ individual plants across both sites. No plants were found at other sites where it once occurred. In 2022 the same team recorded a total of 26 plants at Myora and Cooroon Cooroonpah Creek. In 2024, only 6 plants were recorded at these two sites.

Minjerribah is located within the South East Queensland Bioregion, in the Moreton Pastoral District and the Redlands Local Government Area. The species occurs within one population where it is known historically from 5 sites (Sparshott and Bostock 1993) and Cooroon Cooroonpah Creek (HERBRECS). Of these historical sites there is one reasonably permanent site and up to five ephemeral sites. The reasonably permanent site is the southern end of Myora Swamp, partly within the Myora Conservation Park (Myora C.P. site), between Myora and Dunwich. This represents a large area of suitable habitat (see requirements below). The presence/absence of the swamp daisy at other sites is more variable possibly due to the life span of the daisy, variable recruitment, competition with other plants, time after the last fire, soil saturation or other factors. Three of the five ephemeral locations are present within Myora Swamp, one at Cooroon Cooroonpah Creek and one in Flinders Swamp between Amity Point and Point Lookout. In 2024 the swamp daisy was only found at the reasonably permanent Myora site and Cooroon Cooroonpah Creek site.

The Myora Conservation Park and the nearby Naree Budjong Djara Conservation Park are jointly managed between QYAC and the State of Queensland. Part of the Flinders Swamp site was in Flora Reserve R2572 in 1993. In 2012 this reserve was still shown on cadastral mapping but not in 2025 when it was shown as part of the surrounding state land. The remaining sites are on various tenures and subject to management by a number of agencies with varying degrees of input from QYAC.

Therefore most of the swamp daisy sites do not have protected area status.

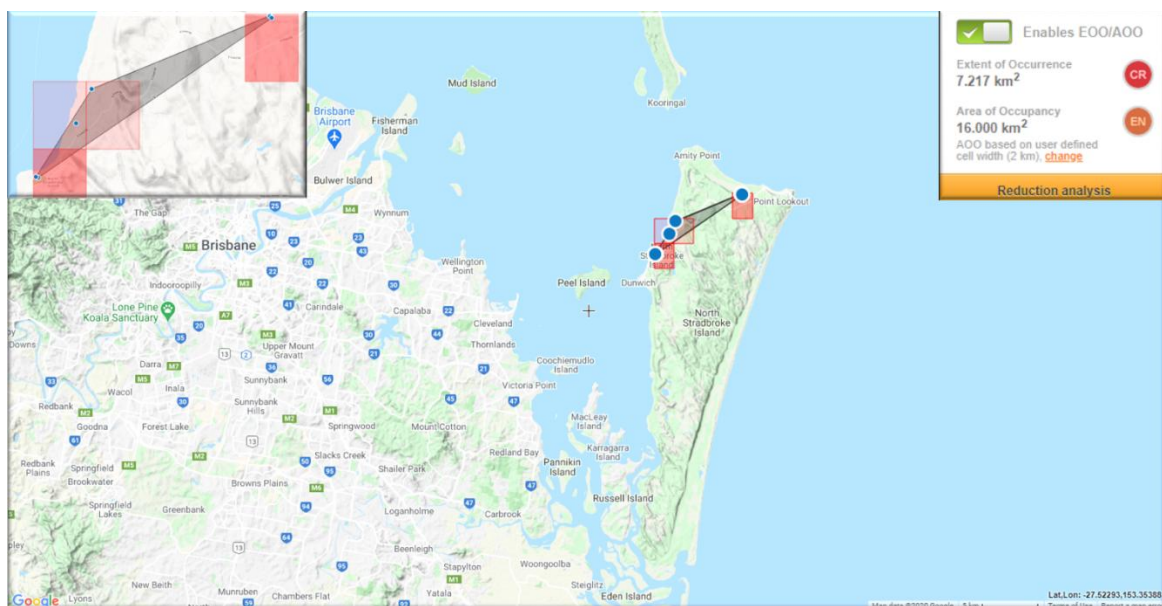


Figure 1. Extent of Occurrence and Area of Occupancy for swamp daisy based on historical records.

The Extent of Occurrence (EOO) for this species has been calculated at 7.3 km² with the inclusion of all sites where this species has been recorded over time; and with an Area of Occupancy (AOO) at 2 km² grid of 16 km² (therefore the overall EOO is raised to 16 km² to align with AOO).

With the exception of the Myora C.P. site (and until recently Cooroon Cooroonpah Creek), individuals have not been recorded elsewhere in the Myora Swamp since the 1990s. No individuals have been recorded at Flinders Swamp since 2001 (HERBRECS 2023).

Recent surveys in 2021 and 2022 (with occasional monitoring of Flinders Swamp from 2010 onward), have confirmed this species currently exists at two of the sites where it has previously been recorded – the Myora C.P. site and the recent rediscovery of the species at Cooroon Cooroonpah Creek. The above EOO and AOO are based on the assumption the species is ephemeral at the less optimal sites, persisting in the soil seed bank until optimal conditions present for the emergence of new cohorts. If this assumption is incorrect, the species is now only extant at two known sites and has become extinct at all other previously known sites. If this is the case the current EOO of the species is 0.14 km² and the AOO is 8 km² (hence the EOO is raised to 8 km² to align with the AOO).

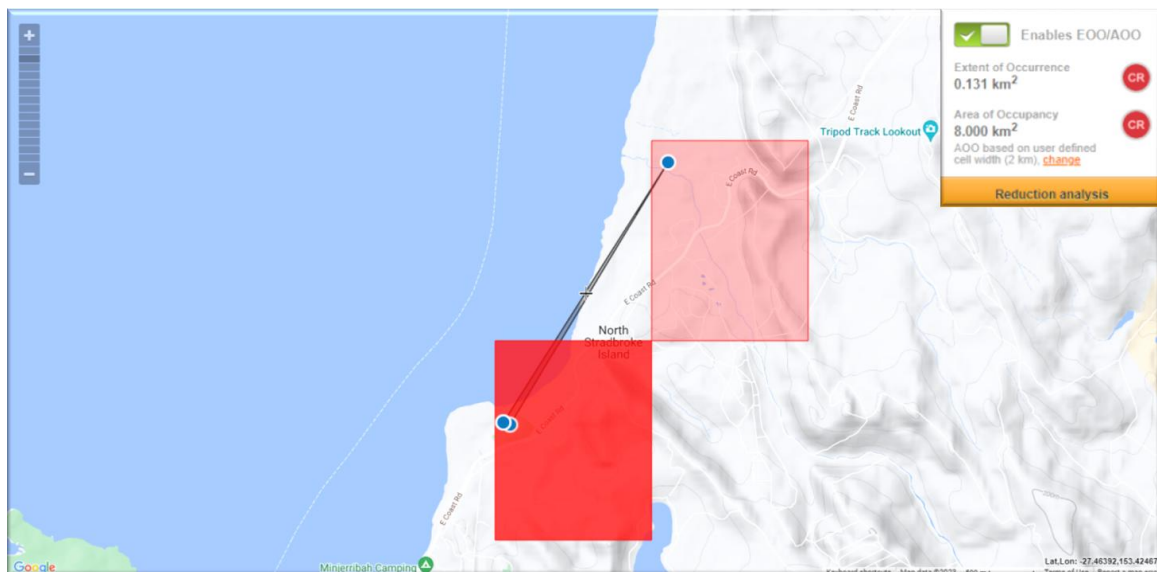


Figure 2. Extent of Occurrence and Area of Occupancy for swamp daisy based on 2022 records.

Habitat Requirements

The swamp daisy appears to have extremely specific ecological requirements (Sparshott and Bostock 1993). It occurs in coastal woodlands and forests dominated by *Melaleuca quinquenervia* (with or without *Eucalyptus robusta*) and species such as *Durringtonia paludosa*, *Gahnia sieberiana*, *Telmatoblechnum indicum*, *Todea barbara* and *Baloskion tetraphyllum* common in the shrub and ground layer.

At March 2025, official RE mapping requires updating to reflect the exact RE in the narrow bands of vegetation where the swamp daisy occurs.

The swamp daisy prefers an acidic substrate with good water retention properties. A pH of 4.2 was recorded at the site where the species was previously observed at Flinders Swamp (Sparshott and Bostock 1993). The species does not tolerate prolonged periods of desiccation and is reliant on groundwater availability for survival. Individuals may have limited reproductive output or succumb prematurely in the absence of adequate groundwater. Recent observations suggest excessive inundation can also be detrimental (J. Halford, J. Aldenhoven, M. Ziirsens pers. comm. 2024). It prefers partial shade under canopy (Sparshott and Bostock 1993) but will not persist in dense shade (J. Halford pers. obs.).

All current and past locations for the swamp daisy are considered critical habitat. There are other wetlands on Minjerribah that could potentially be suitable habitat but this needs further investigation.

Threats

Current threatening processes

Small population size

The small populations size, and consequential low genetic diversity plus narrow extent of occurrence at just two sites makes the swamp daisy vulnerable to stochastic events and other threatening processes.

Inappropriate fire regimes

It is likely that fires will kill existing plants (Sparshott and Bostock 1993) but low to moderate fires may act to facilitate germination by removing competing plants and leaf litter from the ground layer. Fires that are too frequent and too severe can have a devastating effect on swamp environments (Sparshott and Bostock 1993). This could lead to a limited reproductive output, a reduction in population size and depletion and/or destruction of the seed bank.

It's important to establish the most favourable fire regime for the swamp daisy.

Groundwater availability – water extraction

Groundwater is extracted from Minjerribah for town water use (Cox et al. 2011). Surface water contributing to swamps may also be subject to local extraction by off-grid dwellings.

Excess extraction may have negative effects on groundwater dependant ecosystems (Parkyn and Specht 2011) by limiting flow and water accessibility and causing changes to water chemistry and nutrient loads. On Minjerribah, this is most likely to occur at low elevation where groundwater interacts at a point near to or at the surface (Cox et al. 2011). These low elevation discharge and seepage areas support habitat for threatened species such as the swamp daisy (Sparshott and Bostock 1993).

The swamp daisy appears to be heavily reliant on groundwater access for the survival of individuals and sustaining populations. The lowering of the water table was identified as a threat to this species by Sparshott and Bostock (1993).

Excess extraction of groundwater and/or surface water that limits water access to the swamp daisy would have a detrimental effect on individual health, reproductive output, population size and ultimately survival of the species. Impacts will likely be exacerbated with increased water demands of a growing human population. The combined effects of drought and water extraction could cause the peat in swamps to dry out leading to more severe wildfire.

Any anthropogenic interception of water flow to swamp daisy habitat is potentially detrimental.

There is a need for water extraction to be properly regulated for the long term taking into account human and environmental needs and within the context of a changing climate.

Climate change – marine incursion/sea level rise/ rise in water table

Predicted sea level rise brought about by climate change poses a significant threat to coastal ecosystems through the amplification of risks in coastal inundation, storm surge, erosion and saltwater intrusion into groundwater systems (BOM 2022). These processes are already underway (State of the Environment 2021). Rises in the regional aquifer due to exceptional rainfall could also result in inundation.

With the exception of the Cooroon Cooroonpah Creek location, all other sites where this species is known to occur are at elevations ± 1 m above highest astronomical tide. The most populous site, at Myora C.P. is situated on the coastal plain directly behind mudflats and mangroves close to the highest astronomical tidemark. Saltwater intrusion would have a devastating impact on the species and its habitat.

The risks of saltwater intrusion are less at Cooroon Cooroonpah Creek location but not entirely eliminated as shown recently by the predicted storm surge map for Cyclone Alfred in March 2025 (Appendix 2). The suitable habitat at this site is also limited.

Climate change may also bring increased rain events leading to a rise in the water table that could be detrimental to the swamp daisy.

Climate change – fire and drought

Climate change is predicted to increase the prevalence and severity of drought, the length of fire seasons and the prevalence and intensity of severe fire weather (CSIRO 2015). Increased and prolonged droughts will directly affect the swamp daisy population by limiting the amount of available groundwater and by causing the swamp peat to dry out. If fire burns into desiccated peat layers it can smoulder for weeks not only destroying plants but also habitat by altering its structure, at least for a couple of years and potentially longer depending on the intensity of the fire (Sparshott and Bostock 1993).

Accidental trampling - people and animals (domestic, feral and native)

The sparse habit of the swamp daisy makes it difficult to see when not in flower (DCCEEW 2008; Messina et al., 2014; J. Halford pers. obs.). The sprawling, almost trailing habit of the plant exposes it to the risk of damage through trampling by humans and potentially dogs. Native mammals such as wallabies may trample and possibly browse on the swamp daisy (J. Halford; J. Aldenhoven; M. Ziirsens pers. obs.). Ground compaction by excessive foot traffic may damage roots and alter hydrology.

Weed incursion

Weeds that impact the specific habitat requirements of the swamp daisy and compete for resources are likely to kill individuals or prevent the establishment of new ones at affected sites at affected sites.

The Myora site where the swamp daisy has been found most consistently and in the largest numbers historically, is one that is now experiencing the greatest weed incursion. This is likely due to the close proximity to the main cross-island road and human habitation. Bitumen roads and human habitation lead to increased nutrients making their way into the swamp helping promote the growth and spread of weeds.

Weeds already present at Myora swamp daisy site include *Heptapleurum actinophyllum* (syn. *Schefflera actinophylla*), *Psidium cattleianum*, *Eugenia uniflora*, *Archontophoenix alexandrae* and *Lantana camara*.

Groundwater pollution – release of high nutrient loads into groundwater

The environment in which the swamp daisy occurs is one of low nutrient and specific pH such as 4.2 recorded on the Flinders swamp site (Sparshott and Bostock 1993). Species that exist in this environment have adapted to these conditions over time and may be intolerant of altered conditions such as increased nutrients from septic tanks, garden runoff or other human related inputs. Increased nutrient load and changes in water chemistry may also be driven by changes to hydrology brought about by excessive groundwater extraction (Parkyn and Specht 2011).

Changes in water or soil chemistry may negatively impact the swamp daisy directly and via competition with weed species that thrive on the changed conditions.

Mining Legacies

Past mining activities on Minjerribah have included sand mining, which began in the mid-20th Century (North Stradbroke Island Historical Museum 1994) but has recently ceased (Burgin 2020). Small-scale peat mining has taken place historically at Myora Swamp (Sparshott and Bostock 1993). Whilst it is less likely that sand mining may have impacted the swamp daisy population directly, this activity has likely caused the alteration of land contours, indurate layers and hydrological flows. It is important to be aware of these past impacts, particularly hydrological impacts when trying to work out how to improve the survival of the swamp daisy going forward. These impacts on hydrology of swamp daisy habitat represent knowledge gaps to be investigated. Past peat mining may have impacted the population historically via the destruction of individual plants and habitat.

Potential Threats

Land clearing

The majority of known swamp daisy sites are not currently in protected areas. Therefore, there is a potential risk of localised land clearing in swamp daisy habitat for structures and access tracks, including those to the shoreline or freshwater points along creeks and wetlands. Various tenure agencies are responsible for monitoring and taking action on land clearing.

Threat Assessment

Each key threat has been assessed to determine its level of impact to the survival of the species (see Table 1). This has helped to inform the priorities for management response. The qualitative assessment is based on current management practices. The levels of risk and associated priority for response are defined below:

Table 1. Threat Assessment for swamp daisy

Likelihood of occurrence	Consequences				
	Not significant	Minor	Moderate	Major	Catastrophic
Almost certain					
Likely				Small population size Weed incursion	Inappropriate fire regimes Groundwater availability – too much or too little. Water extraction.
Possible			Groundwater pollution – Changes in water chemistry, pH and added nutrients	Climate change – fire and drought Accidental trampling – people and animals Land clearing	Climate change-marine incursion/sea level rise
Unlikely					
Rare or Unknown			Mining Legacies		

Risk Matrix legend/Risk rating

Low Risk	Moderate Risk	High Risk	Very High Risk
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Categories for likelihood are defined as follows:

Almost certain: expected to occur every year

Likely: expected to occur at least once every five years

Possible: might occur at some time

Unlikely: such events are known to have occurred on a worldwide basis but only a few times

Rare or Unknown: may occur only in exceptional circumstances; OR it is currently unknown how often the incident will occur

Categories for consequences are defined as follows:

Catastrophic: population extinction

Major: population decreases

Moderate: population recovery stalls or reduces

Minor: individuals are adversely affected but no effect at population level

Not significant: no long-term effect on individuals or populations

Previous and current conservation and management actions

The swamp daisy has an approved Conservation Advice dated 2008. Current knowledge is summarised in Halford (2023).

Monitoring surveys were conducted in 2021, 2022, 2024 by QYAC, Jason Halford, Jan Aldenhoven and Maree Ziirsen.

The results of preliminary propagation work are reported in Sparshott and Bostock 1993.

Ms Ellie Durbidge of Stradbroke Island Management Organisation (SIMO) raised awareness of the swamp daisy and its need for protection. She assisted scientists who came to the island to look for it, including Kym Sparshott and Peter Bostock in 1993.

Oodgeroo Noonuccal (Kath Walker), a Quandamooka woman, was a founding member of SIMO with Ms Durbidge.

Ms Durbidge donated land at Myora that became the Mungal Nature Reserve for values that included the swamp orchid (*Phaius australis*), the yellow swamp orchid (*Phaius bernaysii*) and the swamp daisy (*Olearia hygrophila*). This reserve is now known as the Naree Budjong Djara Conservation Park.

The Aboriginal families that live adjacent to the Myora Swamp where the swamp daisy and other threatened species exist have long been protective of the area.

All the swamp daisy sites would have been subject to traditional burning prior to European settlement when it was interrupted. Only in recent years have the Quandamooka People been able to lead the way in restoring traditional fire practises.

QYAC has varying degrees of management oversight of the island's natural estate, including swamp daisy sites, depending on the underlying land tenure as outlined in Section "Species Population and Distribution".

Recovery Strategy

This Recovery Action Plan guides recovery actions for the swamp daisy for the next 5 years.

Vision

By 2035 the swamp daisy continues to persist in the wild. Monitoring programs indicate healthy seed production and population growth compared to 2024 levels. The extent of occurrence, area of occupancy and level of protection has improved from 2024 levels. Knowledge of the species has improved. Collaborative partnerships among QYAC, government agencies (local, state and federal), research institutions, conservation organisations and the community continue to drive recovery strategies that ensure the long-term survival of the swamp daisy and its habitat.

Note:

The long-term vision of the recovery program for the swamp daisy extends beyond the life of this plan but is important to state to ensure a consistent, long-term strategy.

The information gained through the implementation of this plan will assist in the management of swamp daisy habitat which may benefit other listed species found in similar habitats.

Goals

There are six goals presented in the following section, each with specific objectives and actions that are practical and have operational steps toward achieving the long-term vision. These goals are for the life of the plan.

The six Goals are:

1. Reduce the threat of small population size and limited extent of occurrence to improve swamp daisy survival in the wild.
2. Investigate and implement appropriate fire management strategies in key swamp daisy habitat.

3. Understand and protect the hydrological requirements of the swamp daisy and investigate the impacts of sea level rise.
4. Manage weeds, trampling from people and animals and other anthropogenic impacts on swamp daisy habitat.
5. Increase the area of protected swamp daisy habitat and the status of protection particularly for known population sites.
6. Stakeholders and community members are engaged in and contribute to the recovery of the swamp daisy.

Recovery Action Table

Actions identified for the recovery of the swamp daisy during the life of this plan are described in Table 2 below under each of the relevant goals and objectives. The information in the Action Table should be interpreted as follows:

		1	2	3
Priority	Level of importance of the action	Taking prompt action is necessary to mitigate the threats and ensure the persistence of the species	Action is necessary to mitigate threats and work towards the long-term recovery of the species	Action is desirable, but not critical to recovery at this time but will provide for longer term recovery

Cost	
Indicative cost estimate ¹	\$1,000s \$10,000s \$100,000s \$1,000 000s

Timeframe	Expected timeframe to start and complete the action	1-2 years	2-5 years	Ongoing
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Potential Contributors²	Identify who leads the action (L). Other contributors (C) are also identified where possible
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Notes

- Costs do not account for inflation, and do not include standard management activities on conservation estate by the department that are to be considered as in-kind contribution. If an action is attributed a cost and it is led by the department then at least a partial in-kind contribution is assumed. The provision of funds necessary to implement actions are subject to budgetary and other constraints affecting the parties involved, as well as the need to address other priorities.
- The nominated lead for actions is not necessarily responsible for cost, however the lead should coordinate as necessary to determine source/s of funding for the activity.

For the Swamp Daisy Recovery Action Plan the lead organisation is QYAC as shown by way of example in Action 1.1.1. All other agencies and personnel are Contributors (C).

Table 2.. Recovery Action Table for the swamp daisy that lists the goals, objectives, performance indicators and actions for the duration of the plan.

Goal 1: Reduce the threat of small population size and limited extent of occurrence to improve swamp daisy survival in the wild

Objective 1.1: Improve understanding and knowledge of swamp daisy's life cycle and habitat requirements				
Performance indicators - Through survey effort and on-site habitat assessments, knowledge of habitat requirements will have improved on current knowledge. - QYAC rangers have an improved understanding and knowledge of swamp daisy's life cycle and habitat requirements. - Population counts conducted at each site annually and population trend monitored over time.				
Action	Priority	Indicative cost	Timeframe	Potential Contributors
1.1.1 Conduct BioCondition surveys at known swamp daisy sites and establish baseline vegetation information before any management, research, other surveys or experimental burns are commenced.	1	\$10,000's	1	QYAC (L), JH (C), JAMZ (C), QTPN (C)
1.1.2 Undertake habitat and environmental surveys of all sites including measuring soil/water pH, nitrogen, phosphorous and other relevant parameters at swamp daisy sites.	1	\$1,000's	1 & 3	QYAC (L)
1.1.3 Conduct annual population surveys of swamp daisy during flowering season with the aim to find all individual plants to build an understanding of health and population trajectory. Record number of individuals, flowering, presence of pollinators, seeding, presence of seedlings and general robustness of plants etc. Consider data collection on a few individual plants over time. Where appropriate check seed viability.	1	\$1,000's	1 & 3	QYAC (L), JH (C), JAMZ (C), QTPN (C)
1.1.4 Search historical sites for swamp daisy for evidence of reoccurrence.	2	\$1,000's	2 & 3	QYAC (L), JH (C), JAMZ (C), QTPN (C)
1.1.5 Identify knowledge gaps and develop a set of priority research questions and share with researchers and experts with a view to conducting research aimed at improving conservation outcomes for the swamp daisy.	2	\$1,000's	1 & 3	QYAC (L), Researchers (C), Experts (C)
1.1.6 Research conducted on swamp daisy following on from 1.1.5.	2	\$10,000's	2 & 3	QYAC (L), Researchers (C), Experts (C)
1.1.7 Implement best practice hygiene protocols to minimize risk of introducing weeds or pathogens for all personnel working in swamp daisy habitat sites.	1	\$1,000's	1 & 3	QYAC (L)

Objective 1.2 Maintain or improve genetic diversity of the swamp daisy over the next 7 years**Performance indicators.**

By 2031

- Genetic diversity of the swamp daisy will be determined.
- The genetic health of Minjerribah's population is stable or improving from 2024 levels

Action	Priority	Indicative cost	Timeframe	Potential Contributors
1.2.1 Undertake genetic sampling of the existing wild population and orchard population* (once established) and potentially from material held at the Queensland Herbarium and Brisbane Botanic Gardens seed bank to inform future translocations and population supplementation to maintain genetic health.	1	\$1,000's	2	QYAC (L), JH (C), JAMZ (C), Researchers (C), Queensland Herbarium (C).
1.2.2 Continue to conduct genetic sampling where appropriate to determine ongoing levels of genetic diversity.	2	\$1,000's	3	QYAC (L), JH (C), JAMZ (C), Researchers (C), Queensland Herbarium (C)

Objective 1.3 Establish a nursery on Minjerribah for propagating the swamp daisy for conservation translocation and research purposes**Performance indicators**

- Conservation-based nursery facility built to propagate threatened species found on Minjerribah.
- Knowledge of best growing medium and water requirements determined.
- Swamp daisy orchard population established on Minjerribah.
- Seed lodged with QYAC and Brisbane Botanic Gardens seed bank.

Action	Priority	Indicative cost	Timeframe	Potential Contributors
1.3.1 Obtain permits for collecting swamp daisy seed and leaves (if required) from the wild.	1	\$1,000's	1 & 3	QYAC (L), DETSI -TSO (C)
1.3.2 Collect seeds annually from the wild using established ANPC collection protocols and Queensland Government requirements (no more than 10%). Keep a percentage for QYAC's nursery and deposit remainder at Brisbane Botanic Gardens Conservation Seed Bank.	1	\$1,000's	1 & 3	QYAC (L), JH (C), JAMZ (C), QTPN (C)

***) Orchard Population of Swamp Daisy.** *These are plants grown in nursery setting from wild seed and/or wild cuttings. Seeds or cuttings from the orchard plants are then propagated to increase the number of orchard plants and provide seedlings or seeds for translocation to the wild. Once the orchard plants are of sufficient numbers, seedlings can also be made available for research. The principle is to not source actual plants for translocation or research from the wild given the rarity of the swamp daisy.*

1.3.3 Build a conservation-based nursery facility at Minjerribah Ganaba to propagate new swamp daisy plants and provide genetically diverse stock to establish an orchard population.	1	\$10,000S	1	QYAC (L)
1.3.4 QYAC rangers gain proficiency in propagation techniques established on common native species before starting on swamp daisy.	1	\$1,000's	1 & 3	QYAC (L), Advisors (C)
1.3.5 Best practice propagation techniques for swamp daisy determined including best growing medium and water requirements (amount and chemistry).	1	\$1,000's	2 & 3	QYAC (L), Advisors (C), Researchers (C)
1.3.6 Collect seeds from orchard population and store in appropriate conditions.	1	\$1,000's	2 & 3	QYAC (L), Volunteers (C)
1.3.7 Conduct trial translocations of nursery-grown, genetically diverse seedlings into known swamp daisy habitats.	2	\$1,000's	2 & 3	QYAC (L), Volunteers (C)
1.3.8 Establish back-up plan for orchard population should Minjerribah's nursery become unavailable for any reason.	1	\$1,000's	2 & 3	QYAC (L)

Objective 1.4 Increase in swamp daisy population size outside of two known sites in next five years.

Performance indicators

- Increase in the species' Area of Occurrence (AOO) and Extent of Occurrence (EOO) from 2024 baseline levels.
- The total population has increased from 6 individuals to over 100 individuals.
- Three or more future translocation sites identified.
- Establishment of 10 plus individuals in three or more sites on Minjerribah.

Action	Priority	Indicative cost	Timeframe	Potential Contributors
1.4.1 Undertake fine scale habitat mapping to help locate potential swamp daisy sites using Bio-Condition, RE and other information.	1	\$1,000's	1	QYAC (L)
1.4.2 Search and survey known and potential new habitat sites for swamp daisy on Minjerribah, and possibly Mulgumpin, Bay Islands and the mainland. Identify suitable recipient sites on Minjerribah above predicted sea level rise for translocated plants. Grade site suitability and prioritise for future re-introduction.	1	\$1,000's	2 & 3	QYAC (L), JAMZ (C), JH (C), Researchers (C), Advisors (C), QTPN (C)
1.4.3 Translocate seedlings from orchard population to 3 additional sites on Minjerribah and possible	2	\$1,000's	2 & 3	QYAC (L)

supplementation of existing colonies subject to lessons learned from trial translocations.				
1.4.4 Monitor survival and persistence of translocated seedlings to determine outcome.	1	\$1,000's	2 & 3	QYAC (L)
1.4.5 Manage risk of trampling by public, native and domestic animals. Consider caging of translocated plants to guard against browsing and trampling by macropods.	1	\$1,000's	2 & 3	QYAC (L)
Objective 1.5 Education and capacity building of QYAC rangers				
Performance indicators Capacity of QYAC rangers to identify, conserve and propagate the swamp daisy is strengthened and maintained.				
Action	Priority	Indicative cost	Timeframe	Potential Contributors
1.5.1 Develop species profile with description and photos of swamp daisy and other similar species for use by QYAC rangers in the field.	1	\$1,000's	1	QYAC (L), JAMZ (C), JH (C), QTPN (C)
1.5.2 QYAC rangers are trained to recognise swamp daisy in the field, and to be able to conduct population and habitat assessments (using tools such as BioCondition), water & soil sampling.	1	\$1000's	1 & 3	QYAC (L), JAMZ (C), JH (C), QTPN (C)
1.5.3 QYAC rangers are trained in propagation techniques and all aspects of operating the nursery.	1	\$1,000's	1 & 3	Advisors (C), Nursery Traders(C)

Goal 2: Investigate and implement appropriate fire management strategies in key swamp daisy habitat

Objective 2.1: Gain better understanding of the role of fire in swamp daisy survival				
Performance indicators - Increased knowledge of the swamp daisy regenerative response to fire. - Increased understanding of appropriate inter-fire intervals that support the persistence and recovery of the swamp daisy.				
Action	Priority	Indicative cost	Timeframe	Potential Contributors
2.1.1 Conduct a literature review of the post-fire response of other species of <i>Olearia</i> to potentially improve understanding of the swamp daisy response to fire and possibly supplement the review with in-field monitoring/assessment of fire response of <i>Olearia nernstii</i> .	1	\$1,000's	1 & 3	QYAC (L), Researchers (C)
2.1.2 Assemble the fire history of the current known, historical and likely habitat areas for the swamp	2	\$1,000's	1 & 3	QYAC (L)

daisy.				
2.1.3 Determine whether more core sampling is required in swamp daisy habitat (and where) to better understand burn history.	2	\$1,000's	2	QYAC (L), Researchers (C)
2.1.4 Develop and implement a post-burn monitoring plan for known, historical or potential swamp daisy sites on Minjerribah in line with accepted protocols (detail methodology, data sheet to record re-sprouting, seed germination, presence of seedlings, plus frequency, extent, timing and intensity of fire). Monitoring to be done at known, historic and potential swamp daisy sites on Minjerribah.	1	\$10,000	2 & 3	QYAC (L), Researchers (C)
2.1.5 Develop and implement an experimental burn program (that considers fire frequency, extent, timing and intensity) at known and historical swamp daisy population sites with the aim of determining preferred fire regime and seed germination stimulus for the swamp daisy.	1	\$10,000's	2 & 3	QYAC (L), QPWS (C), Researchers (C)
2.1.6 Review and amend where necessary QYAC's Jarlo Fire Management Plan rules for Regional Ecosystems that include swamp daisy habitat or likely habitat. Inform QPWS, RCC, Seqwater and other relevant agencies of fire requirements of the swamp daisy as new knowledge is acquired	2	\$1,000's	2 & 3	QYAC (L)
2.1.7. Conduct swamp daisy surveys when planning burns or constructing fire trails in known or potential habitat areas and identify appropriate actions or mitigations to minimise impact on plants.	2	\$1,000's	2 & 3	QYAC (L)
2.1.8 Monitor areas near known swamp daisy populations for threats that would increase the intensity of fire e.g. drought, lowering of water levels, drying peat. (part of 3.1.3).	2	\$1,000's	2 & 3	QYAC (L)

Goal 3: Understand and protect hydrological requirements of the swamp daisy and investigate the impacts of sea level rise

Objective 3.1.: Source hydrological data, analyse and develop monitoring plan for swamp daisy habitat				
Performance indicators - Hydrological requirements of the swamp daisy are better understood and knowledge gaps are identified for future investigation. - Relevant water monitoring plan designed and implemented for swamp daisy habitat sites. - Anthropogenic effects on hydrology, past and ongoing, are better understood and managed.				
Action	Priority	Indicative cost	Timeframe	Potential Contributors

3.1.1 Obtain and analyse available hydrological data from existing bores and monitoring sites for catchments of known swamp daisy habitat, current and historical, to better understand hydrology requirements (including data for regional aquifer and perched systems plus fresh water and salt water levels and water chemistry). Incorporate similar data from organisations who have monitored water on Minjerribah.	1	\$1,000's	2 & 3	QYAC (L), Seqwater (C), DNRMMRRD (C), RCC (C), Sibelco (C), Researchers (C), Advisors (C)
3.1.2 QYAC to partner with researchers to analyse and interpret past and future hydrological data obtained in 3.1.1. Include researchers studying salt marsh, mangroves and similar.	2	\$1,000	3	QYAC (L), Queensland Universities (C)
3.1.3 Using information from 3.1.1 and other relevant data, develop a detailed ongoing water-monitoring plan for swamp daisy sites that identifies the frequency and type of sampling required.	1	\$1,000's	1 & 3	QYAC (L), Hydrology Experts (C)
3.1.4 Develop modelling to better understand hydrology of swamp daisy sites through time and into the future.	1	\$1,000's	1 & 3	QYAC (L), Hydrology Experts (C), Researchers (C)

Objective 3.2 Manage and maintain the preferred water chemistry requirements of the swamp daisy in the wild

Performance indicators

- The water chemistry requirements of the swamp daisy are better understood.
- Mechanisms to maintain appropriate water chemistry for swamp daisy habitat are developed.

Action	Priority	Indicative cost	Timeframe	Potential Contributors
3.2.1 Analyse water chemistry data (from 3.1.1 and monitoring plan) for swamp daisy habitat and determine the preferred water chemistry requirements for the swamp daisy.	1	\$1,000's	1&3	QYAC (L), Researchers (C)
3.2.2 Establish water chemistry monitoring in swamp daisy habitat to further understand requirements and identify any early warning signs of adverse changes (done in conjunction with 3.1.3).	1	\$1,000's	2 & 3	QYAC (L), Researchers (C)
3.2.3 Investigate activities within catchments supporting swamp daisy habitat to identify potential or high-risk pollutants, and try to identify source. Community engagement implemented to manage and work to eliminate or reduce levels.	1	\$1,000's	2 & 3	QYAC (L), Researchers (C)

Objective 3.3 Investigate sea level rise impacts and establish early warning signs

Performance indicators

- The impacts of sea level rise on the swamp daisy are better understood.
- Early warning signs of sea level rise are defined and monitored.
- Emergency translocation plans for the swamp daisy are prepared in the event of harmful sea level rise.

Action	Priority	Indicative cost	Timeframe	Potential Contributors
3.3.1 Hydrological modelling is conducted to predict impacts of sea level rise on swamp daisy populations.	2	\$10,000's	2 & 3	QYAC (L), QLD Government (C)
3.3.2 Monitoring of saltwater intrusion and elevated fresh water levels on swamp daisy habitat is conducted as part of 3.1.3.	2	\$1,000's	2 & 3	QYAC (L), Relevant agencies (C), Researchers (C)
3.3.3 Identify the early warning signs and impacts of sea level rise/inundation on swamp daisy habitat and individual plants including the definition and documentation of decision triggers/thresholds to guide timely and well informed emergency management interventions such as the translocation of remnant plants to safer sites on Minjerribah.	2	\$1,000's	2 & 3	QYAC (L), QLD Government (C), Researchers (C)
3.3.4 Establish vegetation and foreshore monitoring plans to detect potential encroachment into swamp daisy habitat by communities such as swamp oak, (<i>Casuarina glauca</i>) salt marsh or mangroves as a result of sea level rise.	2	\$1,000's	1 & 3	QYAC (L), Researchers (C)
3.3.5 Prepare emergency translocation plans for swamp daisy .	2	\$1,000's	2	QYAC (L), Collaborators (C)

Objective 3.4: Investigate past and potential anthropogenic impacts on the hydrology of swamp daisy habitat, and prepare and implement management strategies

Performance indicators

- Impacts from past mining, road building and other anthropogenic impacts on hydrology are better understood.
- Management strategies are prepared to ensure future impacts on hydrology are avoided.
- Remedies to any changes in hydrology developed.

Action	Priority	Indicative cost	Timeframe	Potential Contributors
3.4.1 Investigate past mining, road building and other impacts to the hydrology associated with swamp daisy habitat (review aerial imagery, core sampling of swamp, drainage) to determine potential impacts and prepare mitigation or remedial plans as appropriate.	2	\$1,000's	2 & 3	QYAC (L), Collaborators (C)
3.4.2 Develop plans for catchments where the swamp daisy is found to identify management	2	\$1000's	3	QYAC (L), QPWS (C)

actions to protect swamp daisy and its habitat and likely habitat from known threats such as pollution, increase or decrease of water supply.				
3.4.3 Identify if remediation is required to fix any past changes in hydrology that negatively impact swamp daisy habitat, determine who is responsible and possible solutions.	2	\$1000's	3	QYAC (L)

Goal 4: Manage weeds, trampling and other anthropogenic impacts on swamp daisy habitat

Objective 4.1: Reduce impact of weeds to the swamp daisy population and its habitat

Performance indicators

- Changes in weed diversity and abundance are monitored through time
- Impacts from weeds to the swamp daisy are managed
- Emerging weeds are identified and appropriate response implemented.

Action	Priority	Indicative cost	Timeframe	Potential Contributors
4.1.1 Investigate weed extent and diversity at current, historical and potential swamp daisy habitat.	1	\$1,000's	1 & 3	QYAC (L), JAMZ (C)
4.1.2 Develop and implement a weed management plan that uses best practice to minimize harm to the environment and people.,	1	\$1,000's	1 & 3	QYAC (L)

Objective 4.2 Reduce impacts of trampling in swamp daisy habitats

Performance indicators

- Trampling of plants by people and animals entering swamp daisy habitat is reduced.

Action	Priority	Indicative cost	Timeframe	Potential Contributors
4.2.1 Develop protocols for and restrict access to swamp daisy sites.	1	\$1,000's	1	QYAC (L)
4.2.2 Reduce publicly available knowledge of swamp daisy locations e.g. remove or obscure location information from iNaturalist and other public sites.	2	\$1,000's	1 & 3	QYAC (L)
4.2.3 Educate QYAC, QPWS Rangers and other key stakeholders on swamp daisy preferred habitat and why care is needed when accessing and traversing habitat areas.	1	\$1,000's	1 & 3	QYAC (L), Advisors (C)
4.2.4 Education of relevant agencies and people living near swamp daisy sites about the risks of damaging or clearing its habitat including by accidental trampling (by people and dogs) and	1	\$1,000's	2 & 3	QYAC (L), Advisors (C)

building informal tracks or water access points.				
4.2.4 Maintain general awareness on potential clearing in swamp daisy habitat and take measures to prevent it. Monitor swamp daisy sites at least annually to check if any clearing has occurred and if found assess what action is needed including remediation.	1	\$1,000's	1 & 3	QYAC (L), Advisors (C)

Goal 5: Increase the area of protected swamp daisy habitat and the status of protection particularly for known population sites

Objective 5.1: Increase the amount of swamp daisy habitat under protected area status

Performance indicators

- Protection for swamp daisy habitat is increased by 2030

Action	Priority	Indicative cost	Timeframe	Potential Contributors
5.1.1 Advocate and take appropriate steps to have more swamp daisy sites covered by protected area tenures, given that many known sites are not found in national park or conservation park. This will also lessen the risk of habitat clearing.	1	\$1,000's	2 & 3	QYAC (L), DETSI (C), JAMZ (C), Collaborators (C)

Goal 6: Stakeholders and community members are engaged in and contribute to the recovery of the swamp daisy

Objective 6.1: Stakeholders and community members are engaged in and contribute to the recovery of the swamp daisy

Performance indicators

- Quandamooka people will have opportunities to engage in the swamp daisy recovery and decision making process.
- The wider Minjerribah Island community will gain a better appreciation of the swamp daisy and is supportive of its recovery.
- Collaboration between stakeholders to support the swamp daisy recovery is established and maintained.

Action	Priority	Indicative cost	Timeframe	Potential Contributors
6.1.1 Consult with Quandamooka Elders and the community to respectfully document knowledge about swamp daisy habitat to inform future management.	1	\$1,000's	1 & 3	QYAC (L)
6.1.2 Provide opportunities and materials to educate the Quandamooka community and the wider island community on the value and significance of the swamp daisy and its habitat.	2	\$1,000's	3	QYAC (L)

6.1.3 Respectful engagement with people living near swamp daisy habitat to build awareness on how to avoid harm to the swamp daisy and its habitat.	1	\$1,000's	2	QYAC (L)
6.1.4 Develop a school-based education program about the swamp daisy.	3	\$1,000's	2	QYAC (L)
6.1.5 Engage with and maintain relationships with all relevant agencies that have activities or responsibilities in or near swamp daisy habitat about the risks to habitat and how best to support recovery (including QYAC, QPWS and other government agencies, utility agencies, research institutes, and landowners).	2	\$1,000's	1 & 3	QYAC (L)
6.1.6 Swamp Daisy Recovery Team meet at least bi-annually to oversee implementation of recovery actions and review progress against performance indicators.	1	\$1,000's	1 & 3	QYAC (L), JAMZ (C), JH (C), QTPN (C).
6.1.7 Continue to promote the swamp daisy recovery program to increase awareness and obtain funding support.	2	\$1,000's	2 & 3	QYAC (L)
6.1.8 Document and share knowledge gained about the swamp daisy to stakeholders including findings related to propagation, research, habitat and fire preferences.	2	\$1000's	2 & 3	QYAC (L)

Evaluation and Review

The effective implementation of this Recovery Action Plan will require coordination by all involved parties. It is recommended that the Swamp Daisy Recovery Team provide guidance and oversight of the implementation of this plan. This working group will meet at least bi-annually to review progress to date and to prioritise and coordinate future work. The annual review of the plan is led by QYAC.

The status and progress toward all goals, objectives and actions in this plan will be assessed against the performance indicators as part of an adaptive management approach to recovery.

This plan may be changed at any point in time, in consultation with all stakeholders, to respond to unforeseen events.

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Appendix 1: Statement of Co-Benefit

A number of other threatened species occur in or nearby swamp daisy habitat including *Durringtonia paludosa* (Near Threatened, NCA), *Phaius australis* (Endangered, NCA; Endangered, EPBC Act) and *Phaius bernaysii*, (Endangered, NCA; Endangered, EPBC Act)

Fauna that use swamp daisy habitat include a genetically distinct population of koalas, *Phascolarctos cinereus* (Endangered, NCA; Endangered EPBC Act). Fruit bats including the grey-headed flying-fox, *Pteropus poliocephalus* (Vulnerable, EPBC Act) are known to feed in Minjerribah's swamps.

Swamps, freshwater streams and springs hold spiritual, cultural and resource significance for the Quandamooka People. Descriptions of resource use for particular swamp plants can be found in Stephens and Sharp 2009 and include medicinal, food, weaving, adornment and wood use.

Any measures to improve and protect the habitat for the swamp daisy will be of benefit to other endangered species and traditional owner values.

Much of the swamp habitat on Minjerribah provides an important buffer between the mangroves and the terrestrial ecosystems.

Appendix 2. Tropical Cyclone Alfred Flood Risk

Map provided by Redland City Council.

Yellow shading – Anticipated Potential Storm Surge 7 March 2025 on NW coast of Minjerribah including Myora and Cooroon Cooroonpah Creek swamp daisy sites.

As it turned out the Cyclone Alfred arrived later and didn't coincide with the high tide. However, the map demonstrates that saltwater intrusion risk is already a real concern for the swamp daisy.

