



THREATENED SPECIES PLAN

*We acknowledge the
Traditional Custodians
of the land on which we
live, work and learn, the
Bunurong people. We pay our
respects to their Elders past
and present.*



Our global commitment

Our Threatened Species Plan represents the Nature Parks' commitment to contributing to the conservation of threatened species within local, national and international frameworks.

This plan aligns with the United Nations' 17 **Sustainable Development Goals** designed to transform our world.

Goal 3: Good health and well-being

Ensure healthy lives and promote well-being for all at all ages.



Goal 13: Climate action

Take urgent action to combat climate change and its impacts.



Goal 15: Life on land

Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss.



Goal 17: Partnerships for the goals

Revitalise the global partnership for sustainable development.



White mangroves *Avicennia marina* at Rhyll Inlet

Cover photographs:

Left: Bush stone-curlew *Burhinus grallarius* Image: Ryan Francis

Right top to bottom: Hooded plover *Thinornis cucullatus* Image: Daniel Lees, Crimson berry *Leptecophylla juniperina* subsp. *oxycedrus* Image: Thomas Nixon,

Eastern barred bandicoot *Perameles gunnii* Image: Thomas Nixon



From the Threatened Species Commissioner

Australia is home to a remarkable array of plants and animals. We are one of just 17 megadiverse countries and have more endemic species than anywhere else in the world. Our native species have incalculable intrinsic value in their own right, but they are also central to our wellbeing, to the health of our economy, and to our cultural history and national identity.

The richness and diversity of life represented across our country is something all Australians should experience, celebrate, and never take for granted. The web of life can be fragile and we all carry the shared responsibility to protect our natural environment and native species.

While we remain an ecologically rich nation, the undeniable fact is that biodiversity loss in Australia has been unacceptably high. Land use change due to agricultural and urban expansion, the introduction of pest plant and animal species including foxes and feral cats, and changes to fire and hydrological regimes are just a few of the threats that have impacted native wildlife populations. Today we have more than 1,800 species and ecological communities listed as threatened under national environmental law. The futures of these threatened species are now more than ever bound to our management and care of them.



Australia's islands represent unique regional examples of our diverse natural and cultural heritage. Disconnected from the mainland, limited in size, and with clearly defined boundaries, islands also provide a distinctive set of environmental challenges and opportunities. When effectively managed these natural arks can act as critical safe havens for the species that inhabit them.

Phillip Island's diverse wildlife and unique characteristics underscores its huge potential to be maintained as a biodiversity hot spot in Australia and showcase for species like the Little penguin, Eastern barred bandicoot, and Hooded plover.

There are several critical ingredients common to effective threatened species management and recovery programs. These include; good planning and management actions that are backed by science, clear goals and a well-coordinated approach, long-term champions and project participants, a high level of community support, consistent funding, and strong, multi-disciplined partnerships. All of these key ingredients are present on Phillip Island and have been evident through decades of dedicated conservation work and major success including the eradication of foxes from the island. The establishment of a comprehensive threatened species management plan further strengthens the chances of long term conservation success.

Importantly, the Phillip Island Nature Parks' Threatened Species Plan has been developed in consultation with range of stakeholders including Traditional Custodians, state and local government authorities, land and wildlife managers, scientists, business groups and a range of representatives of the local community. The Plan draws on local knowledge, the best available science, and diverse perspectives to provide a road map for the coordinated management of the Island's existing threatened species and to lay the groundwork for future introductions.

I congratulate Phillip Island Nature Parks and all those that have contributed to the creation of this Plan. It will serve as an invaluable resource for the Nature Parks team to help guide decision making and actions to maintain Phillip Island an important wildlife refuge into the future.

DR SALLY BOX
Threatened Species Commissioner
Department of the Environment



Bush stone-curlew *Burhinus grallarius* Image: Eric Wheeler



The time to act is now

Phillip Island is an Island haven for unique plants and animals. They are part of our identity, culturally significant to Bunurong peoples who call Phillip Island, *Millowl*, important to the community, the health of our environment and a strong contributor to our economy.

The recently released 2019 report for the Intergovernmental Science-policy Platform on Biodiversity and Ecosystem Services stated that: “biodiversity is declining faster than at any time in human history”.

WWF’s Living Planet Report 2018 reveals that global wildlife numbers have plummeted by 60% in just over 40 years. That’s a 13.6% loss per decade.

Even more frightening, in our own backyard, koalas on Australia’s east coast are declining at a rate of 21% per decade. This figure can sadly be explained by another damning discovery released in the report: ‘Eastern Australia has become a world ‘deforestation hotspot’.

The report also names Australia as one of 11 global deforestation fronts, alongside Borneo, East Africa, the Congo Basin and the Amazon. Australia is the only developed country on the list.

We can all play a part in changing this.

Since the Nature Parks was created, Phillip Island’s (Millowl’s) wildlife and environment have flourished. In a unique conservation initiative, the Summerland Peninsula is restored, securing habitat for Little penguins and other wildlife and creating a majestic canvas for a truly world class visitor experience that can inspire action for conservation.

Declaring Phillip Island (Millowl) as fox-free in 2017 was momentous and maintaining this status whilst tackling other key threats like feral cats is crucial to the success of this plan. The rewilding of Eastern-barred bandicoots onto Churchill Island in 2015 and the Summerland Peninsula in 2017, allowed us to demonstrate our commitment to a program that is working towards establishing Victoria’s only wild populations of this critically endangered species.

We are ready to tackle the many conservation challenges ahead of us. Our Strategic Plan 2018-2023 states as a key aspiration for our organisation: ‘Phillip Island is a safe haven for the protection of native threatened species’.

In 2019, we launched our bold 30-Year Conservation Vision - Beyond the Horizon which recognises the unparalleled opportunity for our organisation to contribute to significant conservation milestones for Victoria through rewilding and protecting threatened species of flora and fauna. The Vision imagines a future for the Island where we live in harmony with nature and where the balance has been restored - where species are no longer threatened and evidence-based management provides suitable ecosystems for our flora and fauna.

Community support and structured decision making are integral to the success of our Threatened Species Program. We will use the best available science to make evidence-based decisions and work in partnership with our diverse community, expert advisors and key stakeholders. This will include working together to eradicate key threats, such as feral cats. This will enable us to drive our aspiration for an Island Haven that supports the environmental, social and economic values of Phillip Island (Millowl).

This Plan is action-based and reflects our long-term commitment to ensuring that we can achieve our goal of implementing a successful and well-resourced Threatened Species Program that comes at a time when our native wildlife populations are in crisis. It also aligns with the United Nation’s Sustainable Development Goals.

Our team will play a significant role in the protection and recovery of threatened species in Victoria. We know this will take courage, conviction and commitment and are looking forward to the challenges and rewards of delivering this program and sharing our progress with you in the future.

JESSICA MCKELSON
Conservation Manager
Phillip Island Nature Parks





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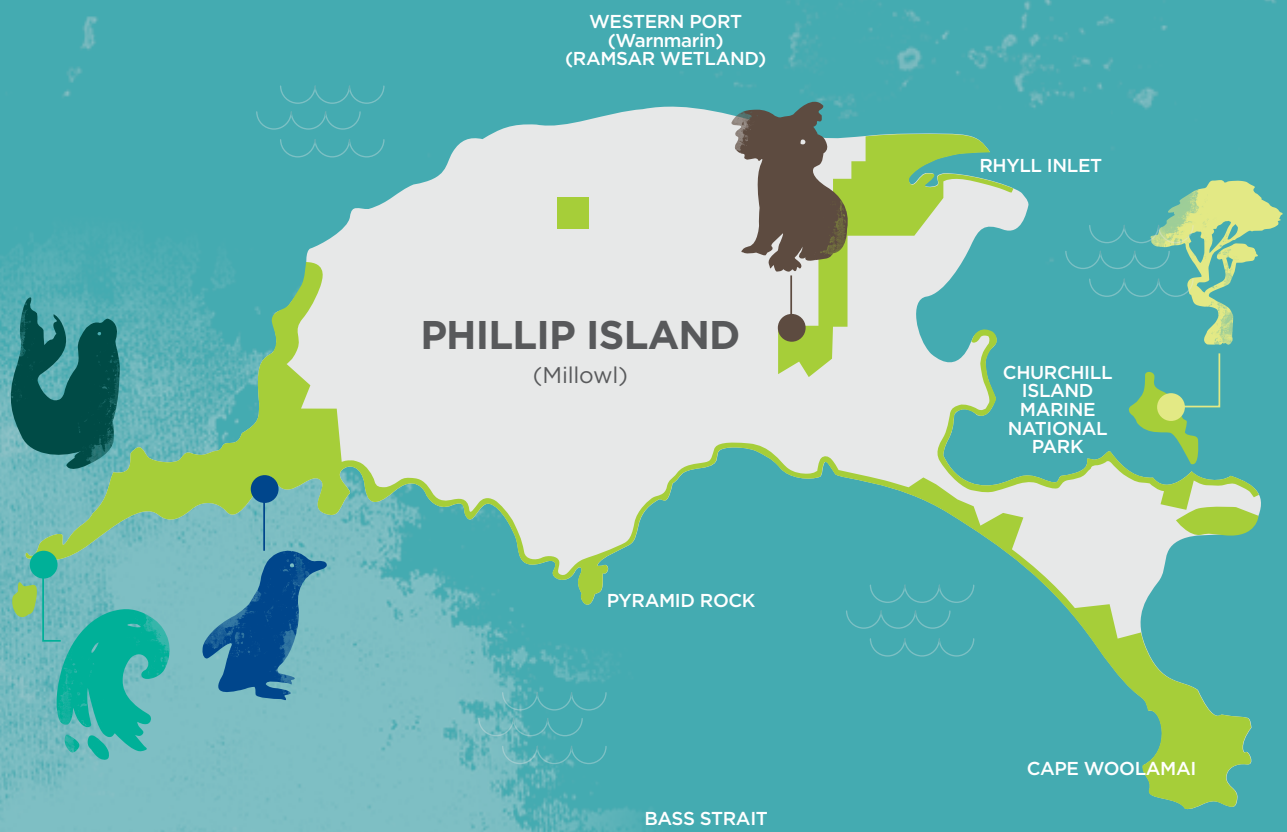
Phillip Island Nature Parks

Our Purpose

To protect nature for wildlife and inspire people to act.

Our Vision

A place where conservation and ecotourism excellence inspire people to actively protect the environment.



For a more detailed map refer to map LEGL/10-005 via our website www.penguins.org.au



We protect nature for wildlife

Phillip Island Nature Parks (the Nature Parks) is dedicated to the protection of Phillip Island's (Millowl's) ecological assets and has a unique opportunity to play a lead role in the conservation of threatened species for Victoria and Australia.

Australia's iconic endemic fauna has suffered an extraordinary rate of extinction in the last 200 years with at least 29 mammal species becoming extinct. Australia is experiencing the highest rate of species extinctions of any landmass during the current extinction crisis. In comparison, only one native land mammal from continental North America became extinct since European settlement. Furthermore, 21% of Australian endemic land mammal species are now considered threatened, signifying that the rate of loss is likely to continue (Woinarski et al. 2015).

More than 80% of Australian mammals and 90% of our trees, ferns and shrubs occur nowhere else on earth (Department of Environment and Energy 2015). However, since European settlement, in just over 200 years, more than 130 of Australia's known species have become extinct, disappearing from the world forever. The list of those species threatened with extinction continues to grow.

Now fox-free, Phillip Island (Millowl) is fortunate to provide haven for a number of rare and threatened flora and fauna species and supports the ongoing protection of these resident species while promoting biodiversity through the reintroduction of significant species.

The Nature Parks' vision is to expand its conservation role by supporting the Island and its community to further enhance its status as an 'Island Haven'. We can return threatened species to the Island and continue to provide sanctuary to resident threatened species.

Over the next five years, the Nature Parks aims to achieve the successful reintroduction of at least two threatened species of fauna, playing a key role in the improvement of the conservation status of these species through increasing breeding productivity, survival, genetic diversity and distribution. To complement these reintroductions, we have an opportunity to focus on the threatened flora that occurs in the surrounding habitat. This holistic approach towards threatened species management encourages an increase in the health and security of biodiversity and important ecosystem functions.

We intend to share achievements and empower people to 'act for conservation', locally, regionally and internationally, positioning the Nature Parks as a recognised leader in Island conservation.



Hooded plover *Thinornis cucullatus* Image: Daniel Lees



We protect nature for wildlife

THIS PLAN IDENTIFIES THE PRIORITY THREATENED SPECIES WE WILL FOCUS ON OVER THE NEXT FIVE YEARS

It also details the actions, proposed timelines and budgets to adequately facilitate the minimal requirements of a Threatened Species Program.

The robust decision-making processes and planning undertaken to produce this document involved both partner and stakeholder engagement which will continue to be essential to the program's success. This includes the production of a dedicated Threatened Species Communication Plan which will be implemented throughout the life of this plan.

THE BIG PICTURE

During what is now described as the 'anthropocene' we must appreciate and believe that we are just as capable of protecting biodiversity as we are reducing it. Protecting threatened species isn't just about protecting species for the species' own intrinsic value. Our capacity to protect threatened species is a reflection of our capacity to protect whole communities of species and the vital services they provide. It is a reflection of our capacity to protect our health, prosperity and happiness.

Biodiversity = The variety of all living things.

Biodiversity is a fundamental element of our planet's life-support system. This is due to the numerous, and often complex, interactions that organisms rely on to survive. As we lose species, ecosystems become less resilient, as do the extant species within them. Biodiversity supports primary production and other ecosystem services that are the foundation of our economies. Greater biodiversity also echoes high levels of spiritual and cultural values that are at the core of human health and happiness. High biodiversity means greater resilience and opportunity for species to thrive and evolve. Maintaining biodiversity is ever more important in a time of unprecedented environmental pressures that threaten life on the planet.

Anthropocene = 'The current geological time whereby human influence dominates the way the earth functions.'

This is the first time ever that the human species has been the primary driving force of influencing global function... **We have an opportunity to use this influence for the good of the planet and its wildlife and environment.**



The Island as a Safe Haven - context and methodology

This Plan forms part of a suite of documents that outline the Nature Parks’ conservation vision. It is directed by our Strategic Plan 2018-2023 and informed by our 30-Year Conservation Vision - *Beyond the Horizon* and actioned by our 5-Year Conservation Plan 2019-2023.

This is the centrepiece that will allow us to achieve our vision of an Island Haven where we can make a significant contribution to Victoria and Australia’s biodiversity.

This plan also supports and aligns with the bigger picture of Threatened Species in Australia via the Australian Government’s Threatened Species Strategy and Victorian Government’s Biodiversity 2037 Plan. These plans set out road maps and highlight how our approach of science, action and partnership can be used to achieve the long-term goal of reversing species declines and supporting species recovery.

The Australian Government’s Threatened Species Action Plans detail the annual instalments of the five-year Australian Government response. It started in 2015 with hard and measurable targets and is reported on and updated annually. This Plan is contributing to the State Government’s Biodiversity Strategy and its implementation will be guided by Victorian State and Commonwealth Government legislation.





The Island as a Safe Haven - context and methodology

THIS PLAN ALIGNS WITH KEY ACTION AREAS THAT ARE PRIORITIES FOR THE AUSTRALIAN FEDERAL AND STATE GOVERNMENT:

- Tackling feral cats
- Safe havens for species most at risk
- Improving habitat
- Emergency intervention to avert extinctions.

Biodiversity 2037 states Victoria's current biodiversity condition: 'Victorians treasure the environment not just for its own sake, but for its indispensable value to individuals, communities, Aboriginal Victorians and society as a whole'.

The Nature Parks' Threatened Species Plan provides an opportunity to Victorians to appreciate Victoria's rich, diverse, unique and precious natural environment.

It also notes that:

- There are more than 5,000 plants and 1,200 vertebrate animals native to Victoria.
- Over a third of these species are of conservation concern (classified as Rare, Threatened or Near Threatened).
- There is a continued decline in the quality and extent of habitat of native species.
- Threats to biodiversity include habitat loss, weeds, pest animals and changed water regimes – all of which will be exacerbated by the effects of climate change.
- Biodiversity has been historically under-valued and is not accounted for in the economy, yet it provides enormous benefits to society.

Our plan aligns with many of the priorities listed in Biodiversity 2037 and the Nature Parks is listed as a lead or associated agency in 15 Priority Statements including:

- **Priority 3** - Raise awareness of all Victorians about the importance of the state's natural environment.
- **Priority 5** - Increase opportunities for all Victorians to act to protect biodiversity.
- **Priority 8** - Better care for and showcase Victoria's environmental assets as world-class natural and cultural tourism attractions.
- **Priority 14** - Engage with Traditional Owners and Aboriginal Victorians to include Aboriginal values and traditional ecological knowledge in biodiversity planning and management.
- **Priority 15** - Support Aboriginal access to biodiversity for economic development.
- **Priority 16** - Build capacity to increase Aboriginal participation in biodiversity management.
- **Priority 17** - Deliver excellence in management of all land and waters.
- **Priority 19** - Adopt a whole-of-government approach to implementing the Plan.

Over the next five years, the Nature Parks will work closely with portfolio partners across Federal, State and local government and the local community.

Our aim is to best align activities and priorities and increase efficiency in achieving the best outcomes for biodiversity with a focus on building the ecological resilience of ecosystems for priority wildlife species facing a changing climate and environment.



Outcomes for threatened species

THE KEY OUTCOMES OF DELIVERING THIS PLAN ARE EXPECTED TO BE:

- Significant contribution to the protection and recovery of threatened species on Phillip Island (Mollw) and Victoria.
- Increased biodiversity and the enhancement of ecosystem function on Phillip Island (Mollw).
- Increased areas of wildlife habitat, communities and their connectivity across Phillip Island (Mollw).
- Increased stakeholder engagement and community ownership of conservation programs including living with wildlife.

IN ADDITION, IT IS HOPED THAT IT WILL RESULT IN:

- An effective decision-making model for Island-wide environmental issues across Australia.
- Increased efficiency in rolling out threatened species projects.
- Contributions to new business opportunities on Phillip Island (Mollw).
- Potential to increase Phillip Island's (Mollw's) social well-being through a closer affinity with wildlife and nature.
- Agility and flexibility to adapt in a changing environment.

KEY DATES:

2020:

- Launch Threatened Species Plan to community and stakeholders.
- Community Engagement commences
- Ongoing Eastern barred bandicoot and Hooded plover management and community engagement.

2021:

- First species release - subject to support and approvals.

2023:

- Second species release - subject to support and approvals.

“Phillip Island's unique landscape, supported by the Nature Parks' exceptional work, has provided an extraordinary opportunity to plan for threatened species recovery. It provides a chance to make as significant contribution to helping fight Australia's extinction crisis.”



RICHARD FAULKNER,
Threatened Species Planner, Phillip Island Nature Parks



Threatening Processes



Creating Safe Havens and controlling threats

The Australian Government’s Threatened Species Strategy identifies creating safe havens as one of its priorities for action.

Safe havens are areas where key threats to plants and animals can be removed, not just managed.

They provide long-term protection, giving at-risk species the space needed to recover and increase their populations.

We have worked in line with the National and State Governments’ key objectives to achieve this with the introduction of Eastern barred bandicoots onto Phillip Island.

It is also essential to provide the correct environmental conditions for threatened species by reducing threats to ensure ongoing sustainability and viability.

THE FOLLOWING WILL BE CRUCIAL TO THE SUCCESS OF OUR THREATENED SPECIES PROGRAM.

- Securing sustainable resources for a long-term program.
- Maintaining the fox-free status of Phillip Island (Millowl).
- Continuing to work towards a feral-cat-free Island and responsible cat ownership by demonstrating 24-hour domestic cat containment.
- Maintaining stakeholder and community engagement through the implementation of the Nature Parks’ Threatened Species Communication Plan and volunteer participation.
- Establishing Threatened Species Recovery group/s or equivalents – involving key partners and stakeholders.
- Undertaking risk analyses for each species to be reintroduced.
- Preparing plans for the Translocation Evaluation Panel (TEP) for each species reintroduction to gain approval from the Department of Environment, Land, Water and Planning (DELWP).
- Developing and implementing Threatened Flora Recovery Plans.
- Considering adjusting timelines according to available resources along with ensuring appropriate social and environmental conditions.
- Apply the principles of adaptive management to continuously review and adjust the program based on available knowledge (Figure 1).

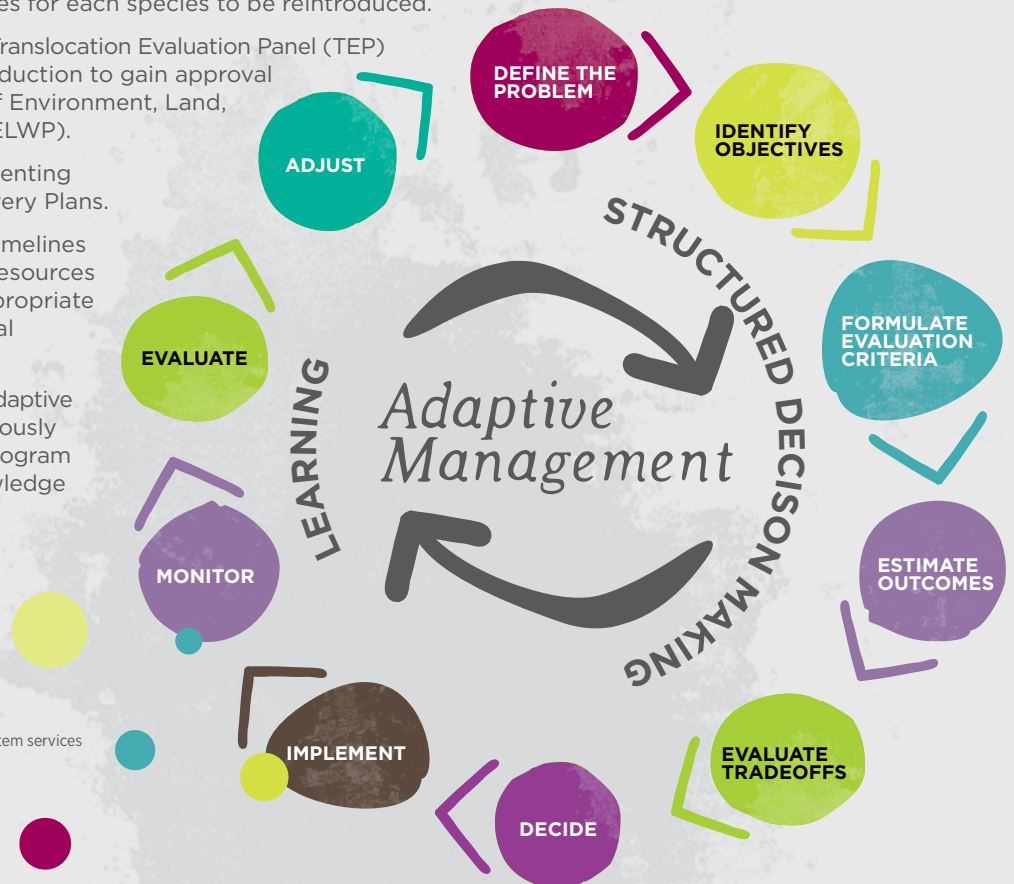


Figure 1: Adaptive management for ecosystem services – adapted from Birgé et al. (2016)



Key threatening processes

The program's success will also depend on the Nature Parks' capacity to mitigate or eradicate the impacts of key threatening processes. The impact of these threats is significant and requires the need for an adaptive and integrated threat management approach that is supported by research-driven practices. The Nature Parks will continue to be involved with the management of the following threats, using research-informed methods to help develop key conservation outcomes for threatened species.

THREAT	KEY ACTIONS
<p>1. Climate change</p> <p>We are experiencing unprecedented, rapid and extreme climate change due to human activity.</p> <p>Species are at risk of being unable to adapt or migrate in response to rapid and extreme changes.</p> <p>The Nature Parks can build resistance into the conservation programs that provide species with an opportunity to adapt to the changing conditions.</p>	<ul style="list-style-type: none"> • Identify and prioritise actions towards species most at risk • Support genetic diversity of species to encourage resilience • Act according to evidence based research, considering: <ul style="list-style-type: none"> • Increased temperatures (land and water) • Longer fire season • Increased frequency of extreme events • Droughts • Storms • Cold snaps/frosts • Seasonal change • Reduced rainfall and humidity • Sea level rise (reduced mangrove and saltmarsh communities) • Erosion • Oceanic acidification • Vegetation change • Viruses and diseases • Assisted species migration (translocation) • Take action to reduce the effects of climate change within our operations by working on an adaptive and resilient approach.
<p>2. Predation pressure</p> <p>Excessive levels of predation drive local populations of species towards extinction.</p> <p>'Australia has 8,222 completely unique islands. Each island represents a precious ecosystem, a place where plants and animals interact in a delicate balance.</p> <p>Island species are highly susceptible to disruption by invasive species, such as feral cats. By eradicating feral cats from islands, we can transform them into safe havens for threatened species and establish islands as one of our key assets in the fight against extinction. A feral-free island can support threatened species, by allowing for existing populations to recover, or through careful reintroductions of species.'</p> <p>(Department of Environment and Energy 2016)</p>	<ul style="list-style-type: none"> • Maintain fox-free status on Churchill and Phillip Islands (Morrowl) • Create a buffer-zone for fox control on Anderson Peninsula (off Island) • Maintain capacity to rapidly and effectively respond to any fox incursions onto Phillip Island (Morrowl) • Ongoing surveillance of the Phillip Island (Morrowl)/San Remo bridge via detection camera • Maintain fox detection dogs and introduce feral cat detection dogs • Maintain baiting permits • Targeted feral cat control and monitoring on Phillip Island (Morrowl) • Work towards making Phillip Island (Morrowl) feral-cat-free • Continue and increase trapping and support baiting capacity • Study feral cat behaviour and population dynamics • Support Bass Coast Shire Council in domestic cat responsible ownership programs and campaigns • Investigate research implications of management (i.e. fox/cat removal – changes in trophic dynamics)



Key threatening processes

THREAT	KEY ACTIONS
<p>3. Pest Plants</p> <p>Weeds alter vegetation composition and function, with impacts potentially resulting in them outcompeting native vegetation and changes in habitat requirements for native fauna, fungi and flora.</p> <p>The Nature Parks will limit the capacity for new weeds to be introduced to Phillip Island (Morrowl) while continuing to contain and eradicate existing weed infestations, in accordance with the Nature Parks' Weed Management Strategy 2018-2023.</p>	<ul style="list-style-type: none">• Prevent new and emerging weeds from establishing within the Nature Parks• Improve hygiene procedures across the Nature Parks• Minimise the impact of established weeds on identified threatened species of flora and fauna• Contain and eradicate new and emerging weeds and high priority established weeds through the integration of weed management techniques• Support partnerships for effective weed management with other public land managers, private landholders and community groups
<p>4. Urbanisation and land development</p> <p>Past and present urbanisation and development of land across Phillip Island (Morrowl) has destroyed, fragmented and limited available habitat for wildlife. The process has also reduced the capacity to control pest plants and animals and manage other threats to wildlife.</p> <p>The Nature Parks will maintain the land it manages and endeavour to strategically expand these areas to increase conservation values when opportunities arise.</p>	<ul style="list-style-type: none">• Maintain and restore the conservation values of areas currently managed by the Nature Parks• Identify and commence the process with Victorian Government to transfer key areas with high environmental value that are unreserved Crown Land, to the Nature Parks• Support Bass Coast Shire Council and private landholders to enhance their capacity to manage land for conservation• Assist the Victorian State Government in implementing the Distinctive Areas Protections aimed at improving protections from inappropriate developments on Phillip Island (Morrowl)



Key threatening processes

THREAT	KEY ACTIONS
<p>5. Fire</p> <p>Native Australian flora and fauna has an important relationship with fire. In many cases, altered fire regimes since European settlement have caused detrimental effects to the health of ecosystems.</p> <p>Ecological burns can be useful for diversity and creating healthy habitat for threatened species.</p> <p>Fire management practices to complement biodiversity can be investigated and carried out by the Nature Parks' conservation team in accordance with their current Fire Operations Plan.</p>	<ul style="list-style-type: none"> • Implement the Nature Parks' Fire Operations Plan 2019-2021 for: <ul style="list-style-type: none"> • Asset Protection: To provide the highest level of localised protection to human life and property and key community assets • Fuel Reduction: To reduce the speed and intensity of bushfire to protect assets including human life, property and biodiversity assets • Ecological value: Management of land for particular values such as improving habitat for Short-tailed shearwaters by reducing weed cover and biomass • Integrating Traditional Ecological Knowledge into practices • Undertake research to understand the influence of fire on biodiversity values and ecosystem health
<p>6. Hydrological changes</p> <p>Residential and commercial developments often cause large changes in water flows to the environment. New and upgrading of hard surfaces (roads) can also significantly increase water flows in localised areas.</p> <p>Future predictions indicate an increasingly saline environment due to the effects of climate change.</p>	<ul style="list-style-type: none"> • Monitor freshwater reservoirs and flows across the Nature Parks • Complete hydrology reports across all Nature Parks reserves • Conduct water testing for salinity in areas where Growling grass frogs may occur • Support Westernport Water, Bass Coast Shire Council and private landholders to maximise their capacity to manage land and water resources for conservation • Consider the use of 'grey' water to achieve threatened species outcomes such as the potential to restore flows to restore wildlife habitat • Monitor and manage flows within our reserves and to work with stakeholders to manage water for environmental values across the Island
<p>7. Biosecurity</p> <p>Increasing traffic and visitation to the Island increases the risk of pathogens being introduced.</p>	<ul style="list-style-type: none"> • Implement biosecurity strategy to minimise risk of pathogens being introduced and spread across the Island • Partner with key stakeholders to introduce an Island-wide hygiene strategy



Engaging our Island community and stakeholders

Phillip Island (Mallowl) has a unique and multi-faceted community. Community members are involved in protecting the Island’s key values and achieving a balance between these in a variety of ways.

This Threatened Species Plan was developed in consultation with key stakeholders representing all parties involved in living with and managing threatened species on Philip Island (Mallowl).

This involved a structured and transparent decision-making process to prioritise which species to translocate to the Island and this will continue at each step of the processes outlined in this Plan. (See Acknowledgements on page 58 for a list of stakeholders)

THREATENED SPECIES COMMUNICATION AND ENGAGEMENT PLAN

A well-structured community engagement and awareness program is critical to work with the community and broader stakeholders to achieve our threatened species objectives.

A Threatened Species Communication and Engagement Plan has been developed to ensure the community is informed and engaged in all stages of threatened species management and this will continue throughout the life of this plan in line with DELWP’s Living With Wildlife Action Plan.

It is acknowledged that consultation and all permit processes are required for re-introductions of threatened species onto Phillip Island (Mallowl) and that each step of the process will require tailored consultation and individual plans to ensure that our community and stakeholders are engaged, informed and supportive of the program.

Effective communication and engagement will ensure that engagement is genuine, well-planned, transparent, inclusive, responsive and relevant. This structured process will ensure that we work genuinely with our stakeholders and community to encourage involvement and empowerment throughout each stage of the process using clear key messages and processes.

The key principles of engagement will focus on collaboration and using the best available scientific knowledge to manage expectations, meet the challenges and realise the opportunities of threatened species management on Phillip Island (Mallowl).

As a conservation community, we need to communicate effectively, driving a co-ordinated effort to make sure we are giving our threatened species the best chance of recovery.

The Australian Government recognises that:

“Where there is a passionate and committed community, working to protect a species from extinction, we know the chance of success increases. When these groups are organised into an effective recovery team, the chances increase even further.”



Current Programs





Protecting resident threatened species

EASTERN BARRED BANDICOOT

Perameles gunnii

Species Summary

There are two sub-species of Eastern barred bandicoots - one in Tasmania and the other on mainland Australia - in Victoria and South Australia. The mainland subspecies is listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999*, and as Extinct in the Wild under the Victorian Advisory List of Threatened Species 2013.

The preferred habitat of Eastern barred bandicoots is a complex mosaic of grasslands and woodlands. Eastern barred bandicoots are omnivorous, though primarily insectivorous. They use their strong claws and pointed nose to dig for food, leaving small cone-shaped depressions. They feed on the grubs of beetles, crickets, grasshoppers, moths, and earthworms. They have also been found to eat small amounts of onion-grass bulbs and fallen fruit. They forage at night leaving their nests within two hours after sunset. Males use an average habitat of four hectares and females utilise an average 1.6 hectares.

Eastern barred bandicoots live up to two to three years in the wild. They are a marsupial with a rapid breeding cycle. They have a gestation period of 12.5 days and give birth to one to three young in each litter. Their breeding is depressed in summer and during times of drought.



Eastern barred bandicoot *Perameles gunnii*



Protecting resident threatened species

Current status on Phillip Island (Millowl):

- In 2015, Eastern barred bandicoots were released onto Churchill Island as part of a joint trial by the Eastern Barred Bandicoot Recovery Team. After two years of monitoring and research, the population had stabilised at around 120-150 individuals.
- This successful trial allowed a second translocation to the restored Summerland Peninsula in October 2017 which is also fox-free, but has a controlled population of feral cats. Our research and monitoring program has shown that their numbers and range are increasing - a promising sign for the future of this threatened species.
- A dedicated group of volunteer research assistants assist with the ongoing research and monitoring program. These volunteers are from a variety of backgrounds including the local community, universities and partner organisations and are integral in the success of this project.

Actions required

- Maintain fox-free status of Phillip Island (Millowl) and Churchill Island
- Continue monitoring in all areas as Eastern barred bandicoots continue to establish across Churchill Island and Phillip Island (Millowl).
- Research into population regulation, meta-population management, survival in the presence of feral cats (predation and disease), optimising genetic diversity.
- Feral cat control and ultimate eradication on Phillip Island (Millowl).
- Maintain Churchill Island as cat-free.
- Maintain community engagement and volunteer participation in bandicoot monitoring and research with potential to expand the volunteer program such as with the Nature Parks' work with Hooded Plover Watch.



Eastern barred bandicoot *Perameles gunnii* Image: Thomas Nixon



Protecting resident threatened species

HOODED PLOVER

Thinornis cucullatus

Species Summary

Hooded plovers are medium-size shorebirds that are endemic to Australia. There are two subspecies; one found in Western Australia (*Thinornis cucullatus tregellasi*) and the other in south-eastern Australia (*Thinornis cucullatus cucullatus*). With around 3,000 individuals remaining in south-eastern Australia and 4,000 in Western Australia (though this number has a large amount of uncertainty), Hooded plovers are listed as Vulnerable in Australia under the *Environment Protection and Biodiversity Conservation Act 1999* and Vulnerable according to the IUCN Red List 2008.

On Phillip Island (Millowl), Hooded plovers are seen along southern and western shorelines and more isolated bay beaches on the northern shore. They forage on the sand, along the waterline and on intertidal rock platforms. Hooded plovers often nest amongst the indigenous Hairy spinifex *Spinifex sericeus*, and can also be seen sheltering on the beach behind clumps of seaweed. Hooded plovers feed mostly by sight using their large eyes and short bills. They are opportunistic feeders, often seen running along the tide wrack (high tide line) in search of food. They eat a variety of invertebrates, such as amphipod crustaceans, molluscs, insects and polychaete worms and plant material including seeds and turions.

The species lay between one and three eggs (usually three) between August and March, with the majority on Phillip Island being laid from December to February. They have a relatively long incubation period of 30 days and chicks fledge approximately 35 days after hatching. This is a critical time in the birds' survival, being extremely susceptible to human-induced threats before they fledge.



Nature Parks staff showing community members Hooded plovers at Shelley Beach, Phillip Island (Millowl)



Protecting resident threatened species

Current status on Phillip Island (Millowl)

- Phillip Island (Millowl) is home to a breeding population of this threatened species listed as Vulnerable at both a Victorian and national level.
- The 50 adults that live on Phillip Island represent 1.6% of the total Australian population.
- Phillip Island (Millowl) provides recruitment (through dispersal) to other areas of the Victorian coast but the population is increasingly under threat from dogs on beaches.
- The Nature Parks has successfully established a volunteer program (Hooded Plover Watch) to assist in breeding success and reducing threats in collaboration with Birdlife Australia, Bass Coast Shire Council, volunteers and the Phillip Island (Millowl) community. The combined actions of these stakeholders and a research-based management plan are contributing to the ongoing recovery of the population.
- Of 38 chicks born in the 2018-19 breeding season, 29 were lost with known dog attacks accounting for six of these.
- Enforcement of dog regulations and ongoing community education are essential for the ongoing success of this program.

Actions required

- Continue to protect and monitor breeding pairs and their nesting sites with Hooded Plover Watch volunteers and in partnership with Council and BirdLife Victoria.
- Continue to band and leg-flag fledglings and monitor movements and survival.
- Conduct four island-wide counts per annum and participate in BirdLife Australia's Hooded Plover Biennial Count.
- Maintain fox-free status on Phillip Island (Millowl) and maintain buffer zone in San Remo.
- Maintain targeted feral cat control measures in priority areas.
- Manage weeds that impact breeding sites by altering dune profiles or by providing harbour for predators.
- Finalise review of dog regulations across the Nature Parks and Phillip Island (Millowl) beaches in conjunction with Bass Coast Shire Council to develop and enforce consistent guidelines.
- Support having no off-leash beaches within the Nature Parks and increase enforcement and compliance with regulations across Island beaches.
- Increase community education around living with wildlife and protecting wildlife on our beaches and actively enforce across the Hooded plover breeding season.



Hooded plover *Thinornis cucullatus* Image: Daniel Lees



A Hooded plover chick banded by Nature Parks staff at Smiths Beach in 2018
Image: Thomas Nixon



Protecting resident threatened species

WESTERN PORT SHOREBIRDS

Species Summary

Across the globe, migratory shorebird populations are in rapid decline. Migratory shorebirds can be found feeding on wetlands, tidal mudflats, beaches and open country. Most make an annual return journey between their breeding grounds in the Northern Hemisphere and their non-breeding grounds in the Southern Hemisphere in our summer. These journeys are many thousands of kilometres and the paths they follow on these migrations are referred to as 'flyways'. In the East Asian-Australasian Flyway (EAAF), significant regional declines are identified in at least 18 species.

In May 2015 the Eastern curlew and Curlew sandpiper were listed as Critically Endangered under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

Current status on Phillip Island (Mallowl)

Phillip Island (Mallowl) supports a group of threatened shorebirds that frequent the Rhyll Inlet (Ramsar Wetland) and Churchill Tidal Flats (Marine National Park) from September to March each year during their non-breeding period. Two of these are Critically Endangered: (Eastern curlew *Numenius madagascariensis* and Curlew sandpiper *Calidris ferruginea*), one Endangered (Red knot *Calidris canutus*) and one Vulnerable (Bar-tailed godwit western Alaska subspecies *Limosa lapponica*). All four species are restricted to feeding at low tide and are therefore susceptible to disturbance then and while roosting at high tide.

The Nature Parks collaborates with the Victorian Wader Study Group to monitor the shorebirds and record any population fluctuations over time, to contribute to ongoing research to contribute to the conservation of this species.



Eastern Curlew *Numenius madagascariensis* Image: Jukka Jantunen



Protecting resident threatened species

Threats to Phillip Island (Mallowl) shorebirds

Most threats occur outside of Nature Parks management areas and include:

- Ports, industrial and residential developments destroying and degrading suitable migratory shorebird habitat.
- Disturbance from recreational activities such as increased tourism, illegal fishing, jet boats, and off-leash dogs. Excessive disturbance can reduce the birds' feeding time, or force them to move to less suitable habitat.
- Pollution from agricultural, residential and catchment run-off e.g. excess nutrients, heavy metals, herbicides, pesticides and industrial waste.
- Invasive species.
- Climate change – expected sea level rises, increased temperatures, and more frequent extreme weather events will further squeeze coastal habitats for shorebirds.

Actions required:

- Continue monitoring by contributing to Birdlife Australia Western Port count and as an adjunct to the Hooded plover count.
- Continue to contribute to research and monitoring with the Victorian Wader Study Group and working towards joint management solutions.
- Support appropriate management of waste transfer stations in Western Port.
- Minimise disturbance at Observation Point while shorebirds are roosting.
- Maintain undisturbed breeding, feeding and roosting areas for shorebirds.
- Continue to protect habitat, minimise disturbance and advocate for the protection of shorebirds.

OTHER THREATENED AND DECLINING SPECIES

The Nature Parks also provides haven and habitat for important visiting or migratory species that should continue to be monitored. This includes species such as: Swift parrot *Lathamus discolor*, Orange-bellied parrot *Neophema chrysogaster*, Latham's snipe *Gallinago hardwickii*, Powerful owl *Ninox strenua* and Freckled duck *Stictonetta naevosa*. We will continue to monitor these species and provide input into their ongoing management.



Latham's snipe *Gallinago hardwickii* Image: Graeme Chapman



Male Freckled duck *Stictonetta naevosa* in breeding plumage Image: Graeme Chapman



Our Threatened Species Prospectus



Recovering threatened fauna

The following five threatened species are recognised for recovery on Phillip Island (Millowl) in our 30-Year Conservation Vision - *Beyond the Horizon* and 5-Year Conservation Plan 2019-2023.

Refer Appendices for full list of - Vulnerable, Rare or Threatened Plant species that occur on Phillip Island (Millowl).



BUSH STONE-CURLEW

Burhinus grallarius

Regional Status: Endangered

Closest found: Central Victoria

Main Threats: Foxes, feral cats, habitat loss

Image: Ryan Francis

The Bush stone-curlew is a large, slim, mainly nocturnal, ground-dwelling bird. Bush stone-curlews have a remarkable courtship dance. They have a wide-ranging diet, but prefer to feed on insects, snails, small lizards, seeds and occasionally small mammals. Their well-known call, a haunting high-pitched wail, was last heard on Phillip Island (Millowl) in the late 1970s.



LONG-NOSED POTOROO

Potorus tridactylus tridactylus

Regional Status: Near Threatened

Closest found: French Island

Main Threats: Foxes, feral cats, habitat loss and fragmentation

Image: Leo Berzin

The Long-nosed potoroo is a small marsupial belonging to a small family called the Potoroidae (rat-kangaroos), within the large superfamily Macropodoidea. They are mainly nocturnal, resting during the day in nests made of leaves under dense cover. Potoroos have a semi-prehensile tail that the female uses to carry nesting material. Fungi form a large part of their diet, which also includes tubers, soil arthropods, seeds, fruits and vegetation. The last wild Long-nosed potoroo was seen on Phillip Island (Millowl) in the 1980s.



GROWLING GRASS FROG

Litoria raniformis

Regional Status: Endangered

Closest found: Gippsland

Main Threats: Habitat loss and fragmentation, predation and chytrid fungus

Image: Ryan Francis

The Growling grass frog is one of the largest frog species in Australia. The females are almost twice the size of males. They prefer to live amongst reeds, sedges and rushes growing in and along slow moving streams, ponds, lagoons, swamps, lakes and farm dams. They have a unique 'growl' when they call during the warmer breeding months and are indicators of healthy freshwater systems. The last Growling grass frog seen on Phillip Island (Millowl) was in 2008.



SWAMP ANTECHINUS

Antechinus minimus maritimus

Regional Status: Near Threatened

Closest found: South Gippsland

Main Threats: Habitat loss and fragmentation, foxes, feral cats

Image: Peter Menkhorst

The Swamp antechinus is a small carnivorous marsupial. It has a highly fragmented distribution in coastal areas, ranging from near Robe in South Australia to Wilson's Promontory in Victoria. Some Victorian mainland populations became extinct in the 1983 Ash Wednesday wildfires. Its habitat includes dense wet heathlands, tussock grasslands, sedgeland, damp gullies, swamps and some shrubby woodlands.



SWAMP SKINK

Lissolepis coventryi

Regional Status: Vulnerable

Closest found: Mornington Peninsula and Western Port Islands

Main Threats: Habitat loss and fragmentation, foxes, feral cats

Image: Jules Farquhar

Swamp skinks, described as 'mini Godzillas', are black and gold with a blue mouth lining. Generally active during the day, they bask and forage in dense, low vegetation up to two metres above the ground. They will readily enter water if disturbed, remaining submerged for considerable periods. Aggressive and territorial, Swamp skinks will shelter in burrows excavated in peaty soil beneath vegetation, and sometimes utilise the burrows of yabbies and crabs.



Recovering threatened flora

The threatened flora species we have prioritised provide an opportunity for an holistic approach to threatened species conservation. We have selected five flagship flora species that will provide over-arching protection to the threatened vegetation communities they represent, including the endangered Plains Grassy Woodland, Swamp Scrub and Coastal Moonah Woodland. These species still exist on Phillip Island (Mallowl) but to ensure their long-term viability their management must be reviewed, adapted and strengthened.



CRIMSON BERRY
Leptechophylla juniperina subsp. *oxycedrus*
Victorian status: **Vulnerable**

Image: Thomas Nixon

A woody, dense shrub with sharp-pointed leaves to 15 mm, white tube-shaped flowers and showy reddish fleshy fruit. It is restricted to coastal granitic areas of Wilsons Promontory, Corner Inlet and Phillip Island (Mallowl).



SMALL GRASS TREE
Xanthorrhoea minor subsp. *lutea*
Local status: **Threatened**

Image: Thomas Nixon

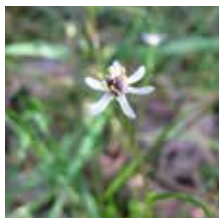
This is a low growing monocot with long, narrow, needle-leaves that emerge in a tuft from an, almost totally, subterranean stem (Conn 1994). Unlike other grass-tree species this species rarely develops a trunk.



SLENDER PINK FINGERS
Caladenia vulgaris
Victorian status: **Rare**

Image: Susan Spicer

This species of orchid can occur in heathland and coastal scrub on moisture-retentive sandy soils. The species is likely to benefit from burning, as long as this does not result in subsequent excessive localised browsing pressure.



ONE-FLOWER EARLY NANCY
Wurmbea uniflora
Victorian status: **Rare**

Image: Susan Spicer

This small lily is inconspicuous when not flowering and flowers between September and January. The potential impacts of burning on the population are unclear, however the responses of the vegetation within the Oswin Roberts Reserve suggest that there may be risks from competition and vegetation closure following burning (Oates and Froud 2013).



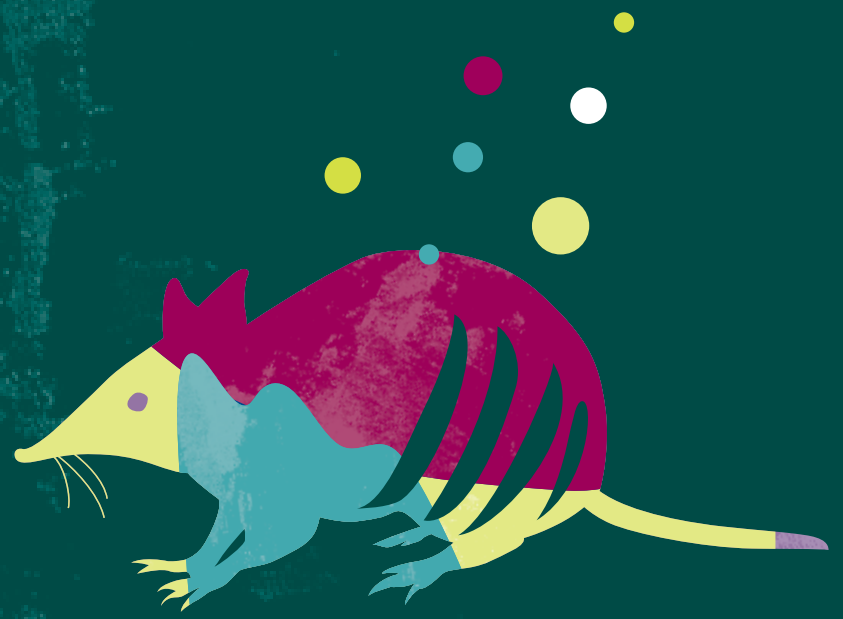
CURRENT WOOD
Monotoca glauca
Victorian status: **Rare**

Image: Thomas Nixon

This dense non-lignotuberous shrub is found on infertile sandy soils at sea-level or on near-coastal high-rainfall ranges and grows in open-forest, heathy woodland, wet closed scrub and margins of cool-temperate rainforest. Identified threats include wallaby browsing and invasive weeds, notably sweet pittosporum, bridal creeper, mirror bush, dolichos and gorse.



Action Plan for Threatened Fauna





Methods

There will be two methods used: Rewilding and translocation of threatened fauna to Phillip Island (Millowl).

TRANSLOCATIONS

Translocation is defined as ‘the movement of living organisms from one area with free release in another’ (IUCN 1987). It refers to the movement of animals from one location to another by humans where those animals are not successfully contained at the release location. Humans have moved animals, both wild and domesticated, between locations for much of their recorded history. Often these shifts have allowed the creation of new wild populations.

Translocations can be broadly sub-divided into three categories (IUCN 1987):

1. **INTRODUCTION:** The intentional or accidental dispersal by human agency of a living organism outside its historically known native range.
2. **REINTRODUCTION:** The intentional movement of an organism into a part of its native range from which it has disappeared or become eradicated in historic times as a result of human activity or natural catastrophe.
3. **SUPPLEMENTATION:** The movement of numbers of plants or animals of a species with the intention of building up the number of individuals of that species in an original habitat.

The motivations for translocations to Phillip Island (Millowl) would be to restore a population that once inhabited the Island (a reintroduction) or to introduce a species to favourable habitat beyond their native range to protect them from human induced threats, such as fox predation (a conservation introduction).

When considering these translocations, there are two purposes:

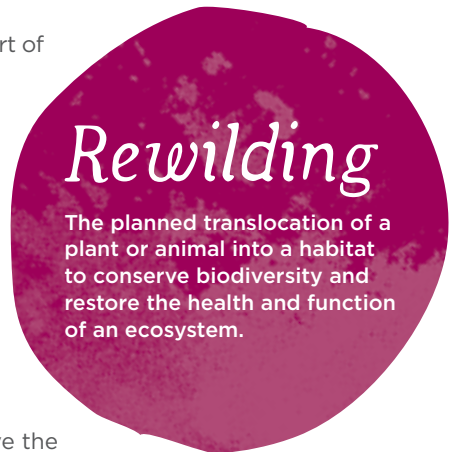
1. Restoring ecological functions that have been lost which will improve the ecological services and resilience of the ecosystem.
2. To improve the conservation status of threatened species or populations.

According to Short (2009), the major factor affecting the success of translocations of mammals in Australia was predation, typically by an exotic predator. Predation was given as the key cause in 80% of failed translocations. Success was greatest for translocations to islands without foxes and cats (82% successful), followed in order by mainland sites fenced to exclude predators (59% successful), islands without foxes but with cats (56% successful), and unfenced mainland sites (53% successful).

Mammal translocations were more successful in larger release areas. Mid-sized areas (5,000 - 50,000 hectares) had a success rate of 79%, small areas 69% and large areas 26%. There was a three-fold difference in success between translocations to medium versus large areas. This may be related to the declining effectiveness of predator management at larger scales. Phillip Island (Millowl) is approximately 10,000 hectares in area and currently fox-free with feral cat control measures in place.

The major factors affecting success of translocations for birds were size of release group and predation. There was a near four-fold difference in success of translocations utilising 50 or more individuals when compared to release groups of less than 20. However releases of Bush stone-curlews were underrepresented in this study and previous successful translocations suggest that a release group of 10-20 birds is more appropriate. Predation was given as the key cause of failure in 64% of bird translocations for which a cause was given. Translocations of birds utilising wild-sourced and captive animals had comparable success (42% versus 43%) and a soft release strategy proved more effective than hard releases (Short 2009). There are comparatively few examples of the translocation of reptiles and amphibians.

Notably, the Nature Parks has been involved in successful translocations of Little penguins to the east of the Summerland Peninsula in the 1980s that restored the population in that area. More recently, the Nature Parks’ successful ‘conservation introductions’ of the Eastern barred bandicoot have paved the way for further consideration of the crucial role Phillip Island (Millowl) can play for the conservation of threatened species.





Bush stone-curlew *Burhinus grallarius* Image: Jennifer C Wright



Reintroductions and rewilding

The process for developing conservation translocation plans for the following species will follow the IUCN Species Survival Commission Reintroduction Specialist Group Guidelines for Reintroductions and Other Conservation Translocations (IUCN 2013).

REINTRODUCTION # 1:

BUSH STONE-CURLEW

Burhinus grallarius

Regional Status: **Endangered**

Closest found: **Central Victoria, throughout Australia (Sparse and Patchy)**

Main Threats: **Foxes, feral cats, habitat loss.**



The endangered Bush stone-curlew *Burhinus grallarius* Image: Eric Wheeler

Rationale

Once widespread, Bush stone-curlews are now listed as Endangered in Victoria due to rapid population decline across Australia's south-east. Phillip Island (Millowl) historically maintained a wild population of Bush stone-curlews, with the last record on the Island being in the 1970s, but they are now locally extinct. Fox predation has been identified as the key contributor to Bush stone-curlew decline in southern mainland Australia (Gates and Paton 2005) and was likely the main contributor to the species' decline on Phillip Island (Millowl). Now fox-free, Phillip Island (Millowl) offers a unique opportunity to protect this species. With the reintroduction of Bush stone-curlews onto the Island coupled with ongoing monitoring and management to maintain a self-sustaining population, Phillip Island (Millowl) can aid in the species' recovery in Victoria and potentially act as a source population for recovery efforts elsewhere.

In addition to the above, results from the Structured Decision Making (SDM) Framework process and consideration of social sensitivities including from the farming community, led to nominating the Bush stone-curlew as the most suitable next translocation. The Bush stone-curlew is perceived as the most innocuous species and has a well established release process and group of experienced practitioners to support it.



Reintroductions and rewilding

Species summary

Well known for their haunting, high-pitched wailing calls at night, they are a large, slim, mainly nocturnal, ground-dwelling bird standing about 55 cm tall. They are mostly grey-brown above, streaked with black and rufous. The bill is small and black, and the eye is large and yellow, with a prominent white eyebrow.

In Victoria they are found predominantly in lowland grassy woodland and open forest remnants of Grey box *Eucalyptus microcarpa*, River red gum *E. camaldulensis* or Yellow box *E. melliodora*, with a ground cover of low, sparse native grass and few or no shrubs (Johnson et al. 1994).

The birds occupy a permanent, loosely-defined home range of about 250–600 hectares. In the breeding season they defend a 10–25 hectare territory around the nest (Johnson et al. 1994). Nests consist of a simple scrape or clearing and eggs (usually two) are laid directly on the ground. Both adults share the incubation and care for the young. Bush stone-curlews are a long-lived species that live for approximately 30 years (McGilp 1947) and form long-term pair-bonds (Flavell 1992). Breeding usually begins at 2–3 years of age (Marchant and Higgins 1993), although Bush stone-curlews in captivity have produced chicks at one year old (J. Lubke, pers. obs. 2018, P Redfearn pers. obs. 2018).

During the day, birds shelter on the ground in lightly timbered habitats amongst fallen tree debris. Their mottled plumage provides camouflage and the open terrain provides good visibility. The daytime roosts are typically found in woodland patches that are less than 1 kilometre from other patches of similar habitat and less than 250 metres from water (Johnson et al. 1994, Webster and Baker-Gabb 1994). At night, Bush stone-curlews travel as far as three kilometres from their roost site to feed in paddocks, wetland or woodland remnants. Their diet is primarily insects, but also includes other foods such as seeds, small fruit, spiders, centipedes, snails, frogs, reptiles and even rodents (Johnson et al. 1994).

Bush stone-curlew reintroduction methodology

When: Estimated Spring 2020

Where: Priority site: Woodlands - Koala Reserve (KR), and surrounding environment (Refer Map).

Alternative sites: Churchill Island, Ventnor Koala Reserve (VKR)

Strategy:

Phillip Island (Millowl) is fox-free and feral cat activity in woodlands area is low or non-existent.

The reintroduction is a trial that may fail due to the presence of predators such as feral cats, road mortality or other factors.

More than one release is anticipated.

Approximately six pairs of sub-adult birds (12 individuals) will be translocated to a fully enclosed, soft-release aviary. Some birds may have some wing feathers clipped to see if this improves survival and breeding success by preventing long-distance dispersal and to encourage them to establish territories as a flock.

They will be supplementary-fed inside the aviary for a period of three months before a door is opened and the animals can begin to venture in and out. This should occur during Spring/Summer when prey availability (insects) is most abundant.

Before doors are opened, establishing birds will be fitted with radio-trackers attached to tail feathers that last for up to four months and come off naturally during moulting. An alternative tracking device based on a GPS mounted on a backpack is being trialled on birds at another site (Mulligans Flat Woodland Sanctuary ACT) which may be considered for use on Phillip Island (Millowl) if their trials are successful. Beyond that, individuals will be identifiable by leg bands and leg flags.

Supplementary feeding will continue and they will gradually be weaned out over the following two months.

A second batch of birds will be released into the aviary and undergo the same process the following year. A total of three to four batches may be required.



Reintroductions and rewilding

Anticipated outcome

- A self-sustaining population of Bush stone-curlews is established on Phillip Island (Mallowl).
- The birds pair up and nest and breed successfully.
- The chicks are fledging successfully.
- It is anticipated that Phillip Island may eventually support a population of 40-100 birds.

Actions initiated

- Partnerships developed with:
 - The Nature Conservation Working Group (Jan and Nev Lubke) - Bush stone-curlew breeders and reintroduction advisors
 - Mulligans Flat Woodland Sanctuary ACT and Moonlit Sanctuary, Victoria - Bush stone-curlew breeders also conducting captive device trials
 - Healesville Sanctuary (Zoos Victoria).
 - DELWP – Biodiversity Division.
- Seek Government support through DELWP.
- Local Community and Stakeholder Engagement Strategy.
- Funding secured for build of soft-release aviary.
- Undertake Disease Risk Analysis (DRA).



Lowesdale soft-release pen Image: Nature Conservation Working Group

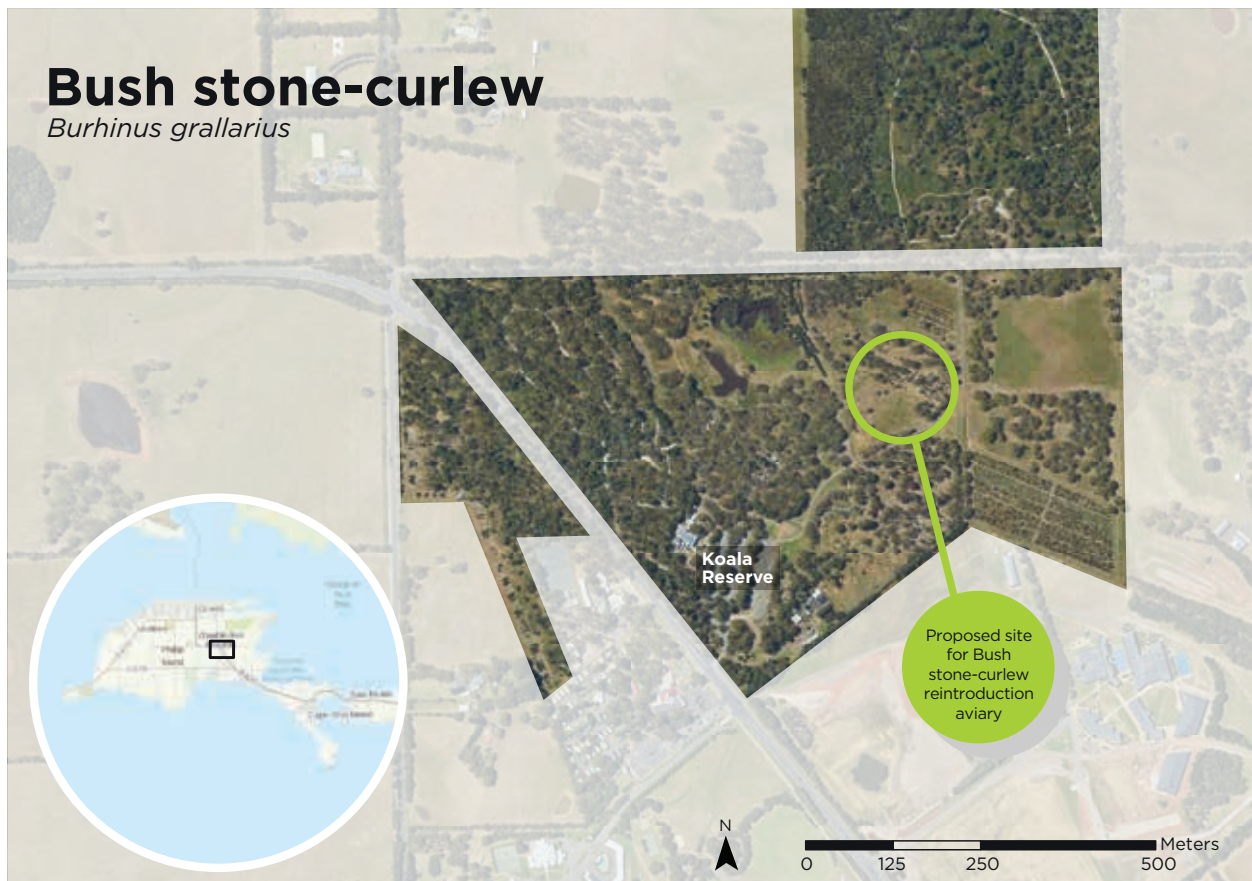


Reintroductions and rewilding

Actions required

- Identify and control key threats
- Maintain fox-free status of Phillip and Churchill Islands
- Secure long-term financial resources
- Develop and implement stakeholder engagement, education and volunteer programs through the Nature Parks' Threatened Species Communication Plan.
- Co-ordinate Bush Stone Curlew Working Group and identify source animals.
- Undertake Population Viability Analysis (PVA)
- Design experimental approach for release strategy (wing feather clipping)
- Build soft release aviary
- Select and acquire tracking and banding equipment
- Undertake DNA testing/surgical sexing
- Develop monitoring program
- Complete required paperwork:
 - Translocation Evaluation Panel (TEP) application
 - Animal Ethics Committee application
 - Obtain Wildlife Act Research Permit
 - Obtain Australian Bird and Bat Banding Scheme Project License
- Ongoing stakeholder engagement and education programs in line with the Nature Parks' Threatened Species Communication Plan.

Proposed site for Bush stone-curlew reintroduction





Long-nosed potoroo *Potorous tridactylus tridactylus* Image: Alexis Sutandio



Reintroductions and rewilding

REINTRODUCTION # 2:

LONG-NOSED POTOROO

Potorous tridactylus tridactylus

Regional Status: **Near Threatened**

Closest found: **French Island**

Main Threats: **Foxes, feral cats, habitat loss and fragmentation**



Long-nosed potoroo *Potorous tridactylus tridactylus* Image: Leo Berzins

Rationale

Populations of Long-nosed potoroos are highly fragmented and in decline, so there is a need to establish a self-sustaining, genetically viable population which can also be safeguarded from their key threats and contribute to Victoria's biodiversity. This is largely how the species was determined as a priority species through the SDM process.

The three extant species of the genus *Potorous* are all of conservation concern due to introduced predators such as foxes and feral cats as well as habitat loss associated with the European settlement of Australia. If effective fox control measures are in place research has demonstrated that Long-nosed potoroo abundance can recover (Murray et al. 2006, Dexter and Murray 2009) though cat control must also be implemented to give the best chance of persistence. Phillip Island's (Millowl) fox-free status and effective feral cat control, coupled with relatively large areas of suitable habitat, make the island suitable for their reintroduction.

Long-nosed potoroos were last recorded roaming free on Phillip Island (Millowl) in the 1980s, but were likely to have been driven to local extinction by fox predation. The return of a self-sustaining genetically viable population on Phillip Island (Millowl) would be a significant boost to the species' security and recovery in Victoria.

In addition to the direct conservation benefits of reintroducing Long-nosed potoroos to Phillip Island (Millowl) there are also likely environmental benefits with the return of important ecosystem functions to the landscape with the dispersal of underground fungi and aeration of the soil.

The ecological benefits of reintroducing Long-nosed potoroos to Phillip Island are complemented by the results of the SDM process. The species was the highest performing alternative under the objectives rated by the stakeholders.



Reintroductions and rewilding

Species summary

Living for about seven years, males are sexually reproductive before reaching their first year, with females becoming sexually mature between one to two years. Adult females produce two to three young per year (Bennett 1989). Females carry a single young in the pouch for about four months and, depending on climate and habitat conditions, they can be found with pouch young at any time of the year, with a peak in late winter.

Generally considered to be nocturnal, they usually rest in shallow depressions or nests (squats) which can be located under tussocks, in thickets or among rocks and against logs during the day. The home range area has been measured between 2-4 hectares for male potoroos and around 1.4-2 hectares for females.

Potoroos play an important ecological role in bushlands, particularly as their diet comprises a high proportion of hypogeous fungi with sporocarps that may enhance the re-establishment of mycorrhizal colonies in disturbed forest sites through dispersal in faeces. The dispersal of mycorrhizal fungi may aid in the recovery of plants regenerating in eucalypt forests (Claridge et al. 1992).

Digging mammals such as the Long-nosed potoroo can also play an important role in mixing leaf litter with soils to aid the aeration of topsoil and breakdown of litter as well as providing substrate for microorganisms, improved water balance and mineral cycles, all which contribute to providing optimal sites for seed germination and seedling establishment (Martin 2003).

Long-nosed potoroo reintroduction methodology

When: Estimated Spring/Summer 2021-2023

Where: Rhyll Wetland has the most suitable habitat for a Long-nosed potoroo reintroduction with surrounding woodlands and patches of thick understorey (Menkhorst 2009).

Strategy

Phillip Island (Millowl) is fox-free and feral cat activity in woodlands area is low. Fungi surveys will occur pre-and post-release to measure the functional impact that reintroduced potoroos have on fungi distribution and ecosystem health.

This reintroduction protocol will be developed in consultation with experts but is likely to be similar to the successful introductions of Eastern barred bandicoots on Churchill and Phillip Island (Millowl).

Anticipated outcome

A self-sustaining population of Long-nosed potoroos is established in and around Rhyll Wetland. Success would provide impetus to reintroduce animals to other sites such as Newhaven Wetland, Churchill Island and Ventnor Koala Reserve.

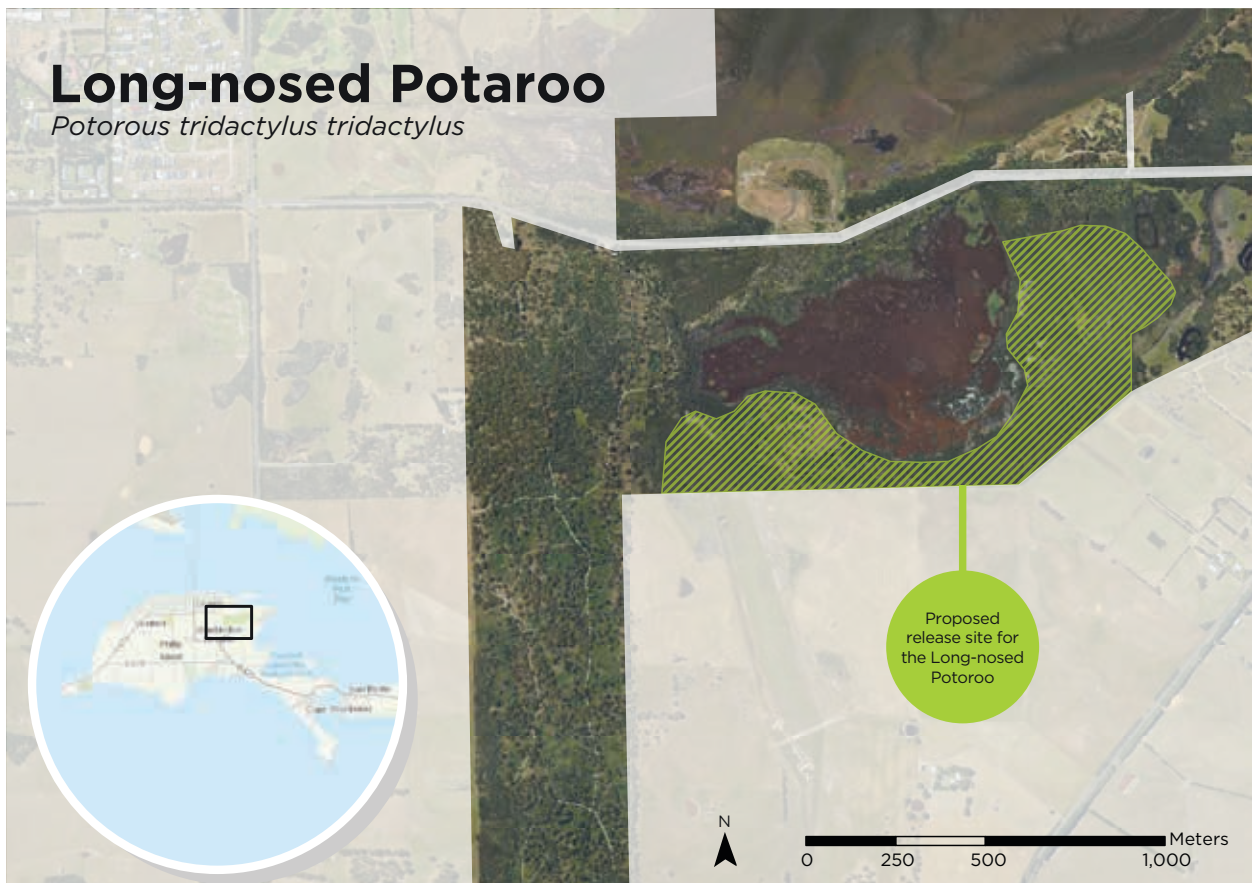


Reintroductions and rewilding

Actions required

- Maintain fox-free status on Phillip and Churchill Islands
- Minimise feral cat activity around the release site
- Identify and control other key threats
- Secure long-term financial resources
- Begin baseline fungi survey/study with expert input
- Establish and co-ordinate Long-nosed potoroo working group in Victoria.
- Undertake Disease Risk Analysis (DRA)
- Identify specific release site
- Identify source animals
- Select and acquire tagging and tracking equipment
- Undertake genetic and veterinary health assessments
- Complete required paperwork:
 - Translocation Evaluation Plan (TEP)
 - Animal Ethics Committee application
 - Wildlife Act research permit
- Ongoing stakeholder engagement and education programs in line with the Nature Parks' Threatened Species Communication Plan.

Proposed site for Long-nosed potoroo reintroduction





Growling grass frog *Litoria raniformis* Image: Ken Griffiths



Reintroductions and rewilding

REINTRODUCTION # 3:

GROWLING GRASS FROG

Litoria raniformis

Regional Status: **Endangered**

Closest found: **Gippsland**

Main Threats: **Habitat loss and fragmentation, predation and chytrid fungus**



Growling grass frog *Litoria raniformis* Image: Ryan Francis.

Rationale

Growling grass frogs are listed as Endangered in Victoria due to habitat loss and fragmentation, predation by the introduced predator *Gambusia holbrooki* and chytrid fungus and the associated chytridiomycosis disease.

The species scored highly during the SDM process with community and expert stakeholders, and therefore has been identified as a third priority species for reintroduction. The species was last recorded in Swan Lake on Phillip Island (Millowl) in 2008 (R. Dakin, pers. comms. March 2008).

Phillip Island (Millowl) may offer a refuge for this species in permanent wetlands such as Swan Lake, but an investigation into the current status of this species on Phillip Island (Millowl) is crucial to inform appropriate future management.



Reintroductions and rewilding

Species summary

The Growling grass frog, also known as the Southern bell frog, is one of the largest frog species in Australia. The females (60-104 mm) grow much larger than the males (55-65 mm) (Pyke 2002). The species live on the ground and in the water, as opposed to being arboreal. They prefer to live amongst reeds, sedges and rushes growing in and along slow moving streams, ponds, lagoons, swamps, lakes and farm dams with temperatures between 18-25°C, using the floating and submerged vegetation for food, shelter, breeding and egg-laying (Pyke 2002).

The species gets its name from the distinct, long growling call that the males will make to attract females during the breeding season (September - March), being active during both the day and the night. The species breeds in the water and may produce clutches of eggs numbering in the thousands. Tadpoles grow quickly and can be up to 10cm long and generally metamorphose after only two to three months, reaching sexual maturity within four months of metamorphosis (Pyke 2002).

Growling grass frogs are a sit-and-wait predator that consumes a variety of invertebrates and small vertebrates such as insects, fish, tadpoles, small lizards and other frogs (Heard et al. 2010). It is possible that adult Growling grass frogs may predate on Mosquito fish, which would aid in the control of this invasive predator and benefit tadpoles in Phillip Island's (Millowl's) wetlands. This relationship will need to be further investigated.

Actions required

- Undertake targeted surveys for their presence on Phillip Island (Millowl) during breeding months (October-February)
 - Remote audio survey research project
 - On-foot surveys with volunteers
- If present, develop a Recovery Plan:
 - Identify and control key threats
 - Check for presence of *Gambusia holbrooki* (invasive predator). If found look into eradication mechanisms.
 - Check for chytrid fungus in other common amphibian species on Phillip Island (e.g. Southern brown tree frog *Litoria ewingii*). If found, look into impact and control. Otherwise develop biosecurity plan to help prevent possible introduction.
 - Rehabilitation/restoration of freshwater bodies including swamps, dams and creeks.
- If locally extinct consider reintroduction.
 - Identify potential source animals
 - Undertake Disease Risk Analysis (DRA)
 - Complete required paperwork:
 - Translocation Evaluation Plan (TEP)
 - Animal Ethics Committee application
 - Wildlife Act research permit
 - Identify specific release sites, which may include rehabilitation/restoration of freshwater bodies including swamps, dams and creeks as well as checking for the presence of *Gambusia holbrooki* and Chytrid fungus
 - Secure long-term financial resources
 - Coordinate with key stakeholders Westernport Water, Landcare, Bass Coast Shire Council, local landholders and Bunurong Land Council Aboriginal Corporation.



Species for future consideration

Further action in threatened species recovery can be invested to begin the recovery of:

- Swamp antechinus *Antechinus minimus maritimus*
- Swamp skink *Lissolepis coventryi*

Both of these threatened species have been identified through the SDM Framework as priorities for reintroduction to Phillip Island (Millowl) but require further monitoring, planning, research, budgeting and resources.

SWAMP ANTECHINUS

Antechinus minimus maritimus

Regional Status: Near Threatened

Closest found: Gippsland – San Remo and George Bass Track

Main Threats: Habitat loss and fragmentation, feral cats and foxes

Rationale

The Swamp antechinus occurs in two sub-species – *Antechinus minimus maritimus* in Victoria and *Antechinus minimus minimus* in Tasmania. In Victoria, it is only found in small isolated populations and is therefore listed as Near Threatened. The species is primarily threatened by changed fire regimes and habitat loss, but also by fox predation (Woinarski et al. 2014).



Swamp Antechinus *Antechinus minimus maritimus* Image: ©Dave Watts

Swamp antechinus are more abundant and less restricted in habitat types on islands compared with the mainland (Sale et al. 2008), though genetic diversity is greater on the mainland.

The species has not been recorded live on Phillip Island (Millowl), but bones of a small dasyurid have been found in shell middens of the Bunurong peoples on the Island.

This species is present on the adjacent mainland and is considered likely to establish successfully in the absence of foxes.

Prior to the release of Antechinus, it is proposed to monitor the population dynamics of two exotic species: Black rat, *Rattus rattus*, and House mouse, *Mus domesticus*, with which it may compete. Competition with exotic rodents may threaten establishment of Antechinus, and the release of Antechinus may reduce the exotic rodent populations.

Species summary

The Swamp antechinus is a small mostly nocturnal marsupial with body weight of 40-90g, a head to body length of 95–140mm, and a tail length which is 70% of the head to body length.

The species has been shown to be an opportunistic dietary generalist (Allison et al. 2006) that favours insect larvae, millipedes and beetles. They also eat some plant material. The Swamp Antechinus is an entirely terrestrial species that eats invertebrates dug from the topsoil and litter and lives in dry grass nests in shallow burrows (Knight and Menkhorst 2010).

Mating occurs during May-July (Sale et al. 2009) and females give birth to six young in July-August after a four week gestation period and are carried in the pouch for up to eight weeks. Young are then left in a den before becoming independent at about three months. Males die within a few weeks after mating. Females of the species are monoestrous (one reproductive season per year) and some females may live to breed in a second season.

They have a highly fragmented distribution in coastal areas, ranging from near Robe in South Australia to the Otway Ranges and Wilson’s Promontory in Victoria due to the patchiness of its preferred habitat across this range. Its habitat includes dense wet heathlands, tussock grasslands, sedgeland, damp gullies, swamps and some shrubby woodlands (Knight and Menkhorst 2010).



Species for future consideration

SWAMP SKINK

Lissolepis coventryi

Regional Status: Endangered

Closest found: Gippsland – Mornington Peninsula, Reef Island, eastern side of Western Port.

Main Threats: Habitat loss and fragmentation, feral cats and foxes

Rationale

The Swamp skink is Endangered in Victoria, being threatened mainly by habitat fragmentation as a result of the loss of critical habitat by removal and draining of swamp, wet heath, riparian vegetation and salt-marsh for urban or agricultural development as well as the destruction of these habitats by introduced herbivores, which leads to fragmented subpopulations that are especially vulnerable to extinction (Cleemann 2015).

The species rated highly in the SDM process, not being likely to have any significant impact on the existing Island community health, native vegetation or agricultural communities.

These small populations are further threatened from predation by introduced carnivores such as feral cats and foxes. Phillip Island (Millow) may offer a suitable refuge for this species, but further research will be necessary – a significant identified threat to this species is the lack of ongoing monitoring of known populations.

Species summary

Growing to about 250mm in total length, the Swamp skink is generally active during the day. They bask and forage within dense, low vegetation and are occasionally found up to two metres above the ground.

Like most skinks, they have a generalist diet containing plant material such as fruits and seeds, a diverse range of invertebrates and some aquatic amphipods (Wilson 2012). They are a relatively cryptic species that will quickly retreat to shelter when disturbed into dense vegetation, under rocks, into logs and even into burrows, including ones they have constructed but also burrows of other species and will also readily enter water, remaining submerged for considerable periods (Chapple 2003).

During periods of inactivity, they shelter in burrows excavated in peaty soil beneath vegetation, and sometimes utilize the burrows of yabbies and crabs. They mate in Spring and generally produce between one and six young (mostly three) in late January or early February (Chapple 2003).



Swamp skink *Lissolepis coventryi* Image: Jules Farquhar



Action Plan for Threatened Flora





Threatened flora

Species description

Both the woodland/wetland and coastal environments of Phillip Island (Mallowl) encompass the majority of its threatened flora and threatened vegetation communities. The selection and active management of five flagship species of threatened flora will provide over-arching protection to the communities they represent.

The woodland and wetland areas of the Nature Parks (including Rhyll Wetland) are home to the highest floristic diversity found on Phillip Island (Mallowl) and comprise one third (ten) of all Phillip Island's (Mallowl's) vulnerable, rare or threatened flora species (Refer Appendices for full list).

Two of the priority species of threatened fauna proposed for reintroduction are woodland species. This provides an opportunity to take an holistic approach to threatened species conservation and could prove to have great benefits to biodiversity and the supporting ecosystems.

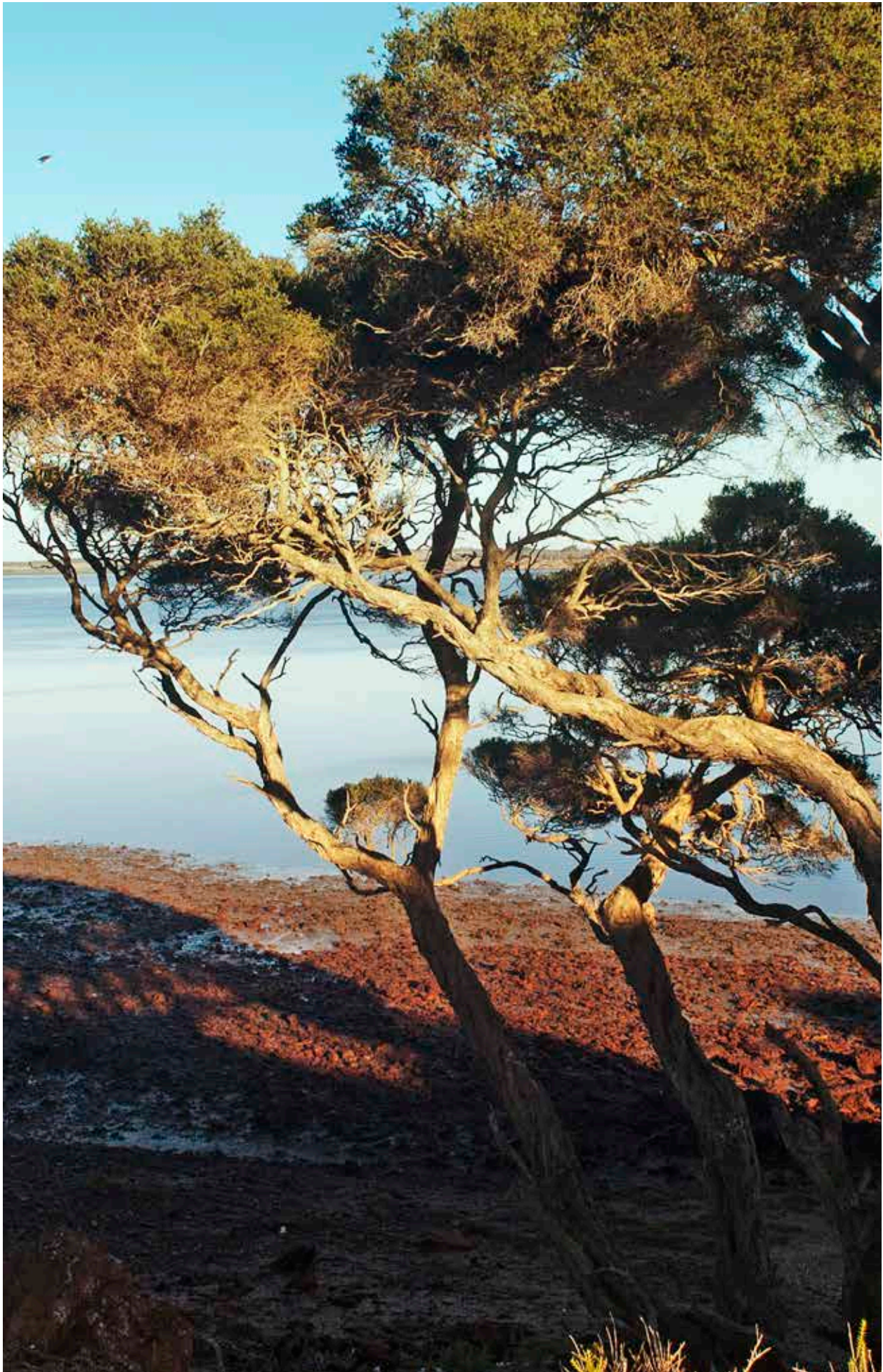
The coastal environment, and threatened flora within it, is also unique and significant to Phillip Island (Mallowl). In this environment, there is opportunity to protect more than 13 species of flora that are Vulnerable, Rare or Threatened on the Island, including the iconic Crimson berry *Leptecophylla juniperina* subsp. *oxycedrus*. Also within the coastal environment, although not threatened as a species itself, the Moonah *Melaleuca lanceolata* subsp. *lanceolata* is locally and culturally significant and represents the *Flora and Fauna Guarantee Act* - listed community of Coastal Moonah Woodland.

Other locally significant species have also been identified in these areas, such as the Small grass tree *Xanthorrhoea minor* subsp. *Lutea*, providing further opportunity to focus on these species to prevent them from further decline or becoming locally extinct on Phillip Island (Mallowl).

Key threats

- Predation pressure by herbivores (e.g. rabbits, wallabies)
- Competition by other plants (weeds and native species)
- Inappropriate fire regimes
- Disease (e.g. phytophthora)
- Climate change
- Habitat loss due to development and urbanisation.

Measures to mitigate these threats will be essential for the conservation of these species.



Moonahs *Melaleuca lanceolata* subsp. *lanceolata* on shores of Western Port, Phillip Island (Millowl) Image: Thomas Nixon



Threatened flora

Overall recommendations for Threatened Flora

Further field assessment and expert knowledge is required to adequately assess what is required to tackle threatened flora management. Internal field assessments are underway and will be carried out according to appropriate seasonal variation (i.e. when flowering).

Threatened Flora Recovery Plans are to be developed over six months, with recommended actions implemented from July 2020. Recovery plans are likely to suggest some, or all, of the following:

- Mapping and monitoring of threatened flora
- Rabbit control program implemented with key stakeholders
- Management of native browsers (wallabies, possums)
- Weed removal
- Hygiene protocols/biosecurity of key priority areas to reduce the likelihood of diseases/pathogens
- Native vegetation thinning/slashing
- Fencing and/or coup design
- Propagation of threatened flora
- Establish new populations in suitable areas
- Introducing new (outside) plant stock/genetics
- Manipulation of fire regimes
- Education through actions in the Threatened Species Communication Plan
- Involvement in advocating for flora surveys in planning and development applications.

Decision making framework

The approach to decide which threatened flora the Nature Parks would focus on differed from the process for selecting fauna species.

The key difference is that the primary threat (i.e. rabbits) has not been removed, as is the case for threatened fauna with the removal of foxes.

Until we can remove key threats such as hyper-grazing/browsing pressure from rabbits, we would be unlikely to have any success with translocations, so would not consider this. It would also mean that management actions would be mostly restricted to the land managed by the Nature Parks.

We used the Nature Parks' Conservation team's knowledge and expertise to undertake a simplified structured decision model. A list of Victorian Rare or Threatened Species on Phillip Island (Millowl) was collated with locally significant species added by the Nature Parks' Conservation team.

An internal Nature Parks team scrutinised the list considering the capacity to achieve the following objectives for each species:

1. Reduce the major threat (i.e. browsing, disease) to threatened species
2. Expand area and/or increase resilience of threatened species distribution
3. Increase integrity of island ecological function
4. Contribution to cultural significance
5. Potential for public engagement. It was also agreed that the species chosen should, more broadly, be representative of threatened vegetation communities and provide benefit to these communities.



Threatened flora species for recovery

Based on this process, our five priority flora species were agreed upon.

Recovery Plans for these species will be specified in:

1. Crimson Berry *Leptechophylla juniperina* subsp. *oxycedrus* on Phillip Island (Millowl).
2. Small grass tree *Xanthorrhoea minor* subsp. *lutea* on Phillip Island (Millowl).

Threatened Woodland Flora on Phillip Island (Millowl) incorporating:

3. Slender pink fingers *Caladenia vulgaris*
4. One-flower early nancy *Wurmbea uniflora*.
5. Currant wood *Monotoca glauca*.



Currant wood *Monotoca glauca* at Oswin Roberts Image: Mitchell Burrows



Threatened flora species for recovery

CRIMSON BERRY

Leptechophylla juniperina subsp. *oxycedrus*

Crimson berry is of the Epacridaceae family. It is a shrub with sharp-pointed ericoid leaves to 2cm and showy reddish fleshy fruit (Costermans 1981). Crimson berry grows in Coastal Headland Scrub. Sutter and Downe (2000) mapped it in an Aeolian Sand Coastal Headland Scrub/Coastal Tussock mosaic. It typically occurs on granite cliffs.

The conservation status of Crimson berry on Phillip Island (Millowl) may be critical.

Relatively few individuals persist, they appear to be relatively old and there is no recruitment.

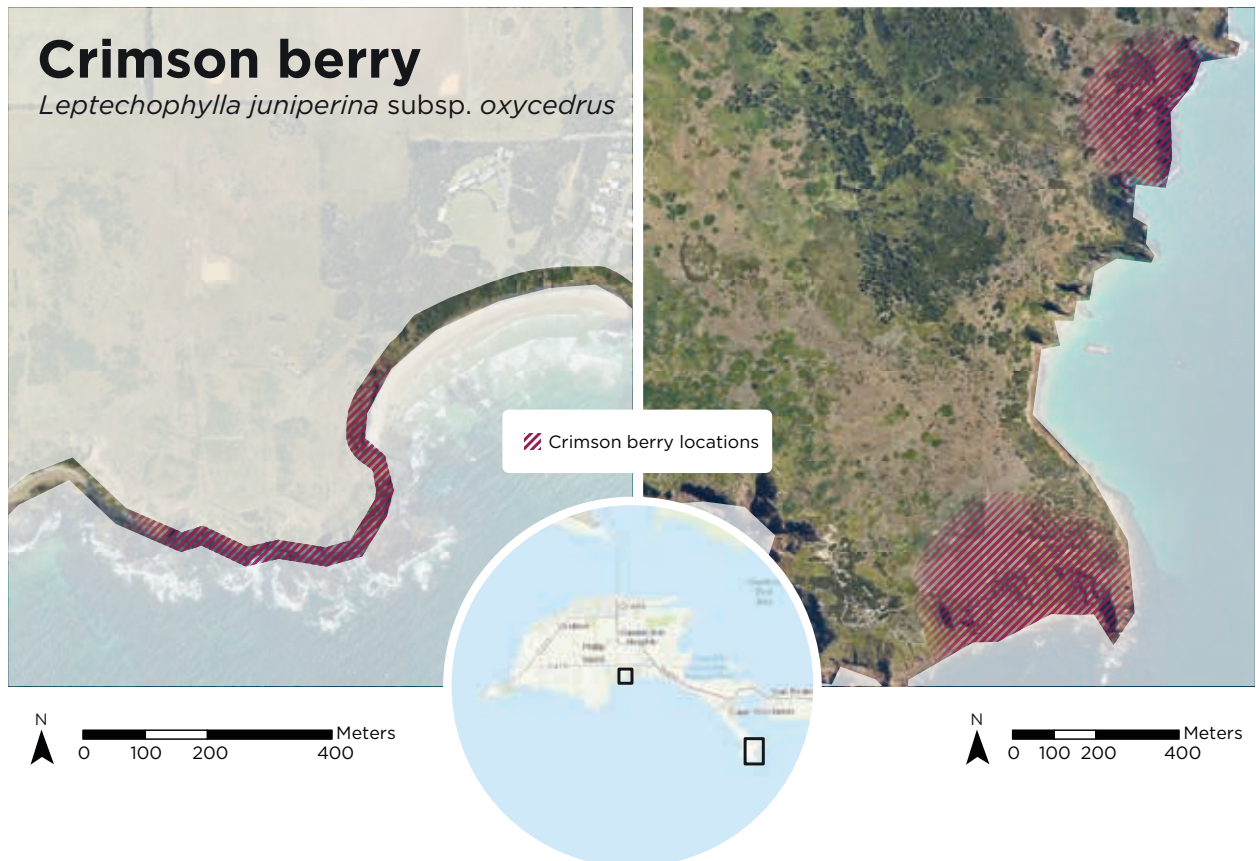
Recommendations:

- Assessment undertaken into the current status of Crimson berry on Phillip Island (Millowl)
- Recovery Plan developed for Crimson berry on Phillip Island (Millowl)
- Investigation of techniques to successfully propagate this species
- Consideration of opportunities to translocate/relocate vulnerable individuals



Leptechophylla juniperina subsp. *oxycedrus* Image: Susan Spicer

Crimson berry locations





Threatened flora species for recovery

SMALL GRASS TREE

Xanthorrhoea minor subsp. *lutea*

The Small Grass tree *Xanthorrhoea minor* subsp. *lutea* is a low growing monocot with long, narrow, needle-leaves that emerge in a tuft from an, almost totally, subterranean stem (Conn 1994). Unlike other grass tree species this species rarely develops a trunk. It has small flowers, with showy white anthers, that are densely clustered around the tall (up to 90 cm) flowering stem, making for a prominent display. The *lutea* subspecies is the only representation of *Xanthorrhoea minor* in Victoria (VicFlora 2018).

In April 2018, a small persisting population of *Xanthorrhoea minor* subsp. *lutea* was identified on Phillip Island (Millowl). In response, a botanist was employed to carry out a survey (Bennetts and Osler 2018). This area is also the last site that Southern emu-wrens were recorded on the Island (Pizzey, G. pers. comms. 2000).

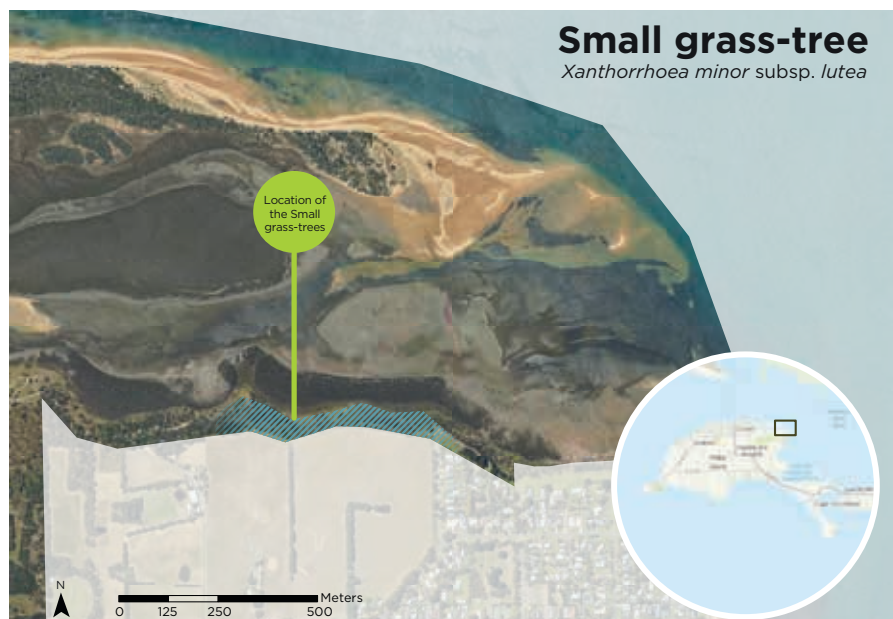


Xanthorrhoea minor subsp. *lutea* Image: Thomas Nixon

Survey recommendations

- Test soil from several locations in the population for the presence of *Phytophthora cinnamomi*. Develop appropriate strategy to address the presence of the fungus or how to prevent the fungus from entering the area where the species are persisting.
- Clear selected Coastal tea-tree *Leptospermum laevigatum* from within and immediately around the Small grass tree population to allow more light to the plants. Note supplementary planting of Drooping she-oaks *Allocasuarina verticillata* may be required in this area to re-establish an appropriately open canopy (e.g. one canopy species per 10m²).
- Collect seed and propagate the Phillip Island (Millowl) Small grass trees to ensure the local provenance flourishes in the future.
- Investigate the potential of revegetating the north-east face of the Rhyll quarry with Small grass trees and other species from the Drooping she-oak *Allocasuarina verticillata* - Sweet bursaria *Bursaria spinosa* woodland along the escarpment.
- Investigate other locally rare and important flora species and what is required to ensure their persistence in a changing climate.

Small grass tree -
Management zone





Woodlands flora management zone

SLENDER PINK FINGERS

Caladenia vulgaris

Slender pink fingers is a terrestrial orchid that grows to 35cm tall, with one or two small, dull pink flowers; labellum with a strap-like mid-lobe; sepals to 18mm long (Backhouse and Jeanes 1995). It flowers October to December and is most easily identified by its tall, slender flowering stem, a long leaf that almost reaches the flowers, and relatively small (to c. 12mm across) dull pink, partially opening flowers (VicFlora 2018).

Slender pink fingers is found in scattered populations across South Australia, Victoria and Tasmania and grows in heathland and coastal scrub on moisture-retentive sandy soils (VicFlora 2018). They have been found on Phillip Island (Millowl) within both the Herb-rich Foothill Forest/Grassy Woodland Complex (EVCs 23/175) and Damp Sands Herb-rich Woodland (EVC 3).



Slender pink fingers *Caladenia vulgaris* at Rhyll Image: Susan Spicer

Doug Frood located several small populations in Oswin Roberts Reserve and in the north-eastern corner of Rhyll Wetland during the orchid survey of 2007-2008. He observed a total of at least 30 plants but notes that they can be easily overlooked when not flowering so the population may be higher (Frood 2009). Recently there have been approximately ten plants in the Rhyll Wetland area recorded. One plant has been found in Oswin Roberts Reserve.

Recommendations:

- Further mapping and assessment of population size
- Produce Threatened Flora Recovery plan identifying key management actions

ONE-FLOWER EARLY NANCY

Wurmbea uniflora

One-flower early Nancy are herbs 4-17cm high, monoecious. They have three leaves, linear, the lowermost without expanded sheathing base, 3-8cm long, 1.5-2mm wide. They have a solitary flower (rarely twinned); tepals narrowly ovate, 5-7mm long, very shortly fused basally, spreading, white; nectaries are two per tepal situated about one-third from base, narrow, marginal, prominently thickened, white; stamens are from two-thirds to three-quarters as long as tepals, anthers yellow; ovary 2-3mm long. They flower from September to January (VicFlora, 2018).

Doug Frood located populations of One-flower early Nancy in the north-east corner of Rhyll Wetland in 2008 (Frood 2009). They continue to persist in this vicinity. Presently there is a large patch of several hundred scattered across an area of about 10 square metres and a few patches on the fire track.



One-flower early Nancy *Wurmbea uniflora* at Rhyll Image: Susan Spicer

There is some concern that the timing of slashing the track has affected these population sizes. Whilst slashing can have a positive influence on population sizes it can also be detrimental if done at the wrong time. One-flower early Nancy was also recently recorded for the Rhyll Cricket Ground. There is an area of approximately five square metres of up to about 100 plants.

Recommendations

- Further mapping and assessment of status
- Produce Threatened Flora Recovery plan identifying key management actions



Woodlands flora management zone

CURRENT/GOLDEN WOOD

Monotoca glauca

Currant wood occurs on infertile sandy soils at sea-level or on near-coastal high-rainfall ranges. It grows in open-forest, heathy woodland, wet closed scrub and margins of cool-temperate rainforest in South Australia, Queensland, New South Wales, Australian Capital Territory and Victoria.

Currant wood is a dense, non-lignotuberous shrub or small tree that grows up to 7 metres high. It has elliptic to leaves that are 8-32mm long and 2.1-6.5mm wide. Flowers are found in axillary spikes or the lowermost solitary and pedunculate. Fruits are ovoid, ellipsoid or spherical, 1.8-2.4mm long and greyish-purple at maturity. Plants will flower from September to April (VicFlora 2018).

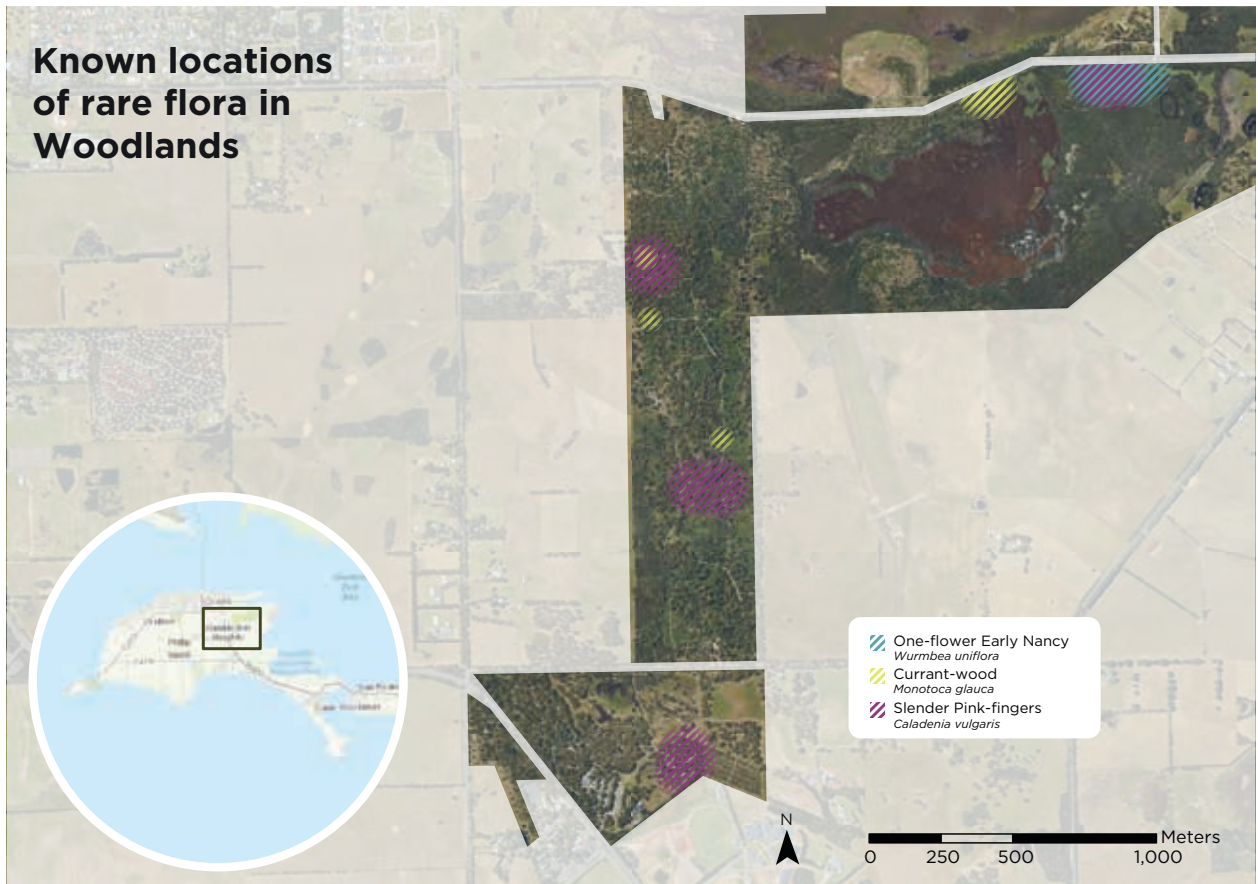


Currant wood *Monotoca glauca* at Oswin Roberts Image: Thomas Nixon

Recommendations

- Further mapping and assessment of status
- Produce Threatened Flora Recovery plan identifying key management actions.

Woodlands Flora management zones





Our Decision Making Framework





Structured Decision Making

A robust, transparent and proven decision making process formed the basis for the development of this plan.

It is important to note that, ultimately, any translocation of species in Victoria requires State Government approval.

We utilised Structured Decision Making (SDM) as a framework to ensure a best-practice, robust and transparent approach for determining the list of most appropriate species for translocation. A similar SDM process was then undertaken for each proposed species to develop the actual translocation actions that form the basis of the translocation plan for that species.



SDM WORKSHOP

The University of Melbourne’s Centre for Environmental and Economic Research (CEER), ran an independently facilitated workshop to guide key stakeholders through a ‘rapid prototype’ of the SDM process. The process identified key objectives which were then used as measures to score each species and rank them into a priority ordered list.

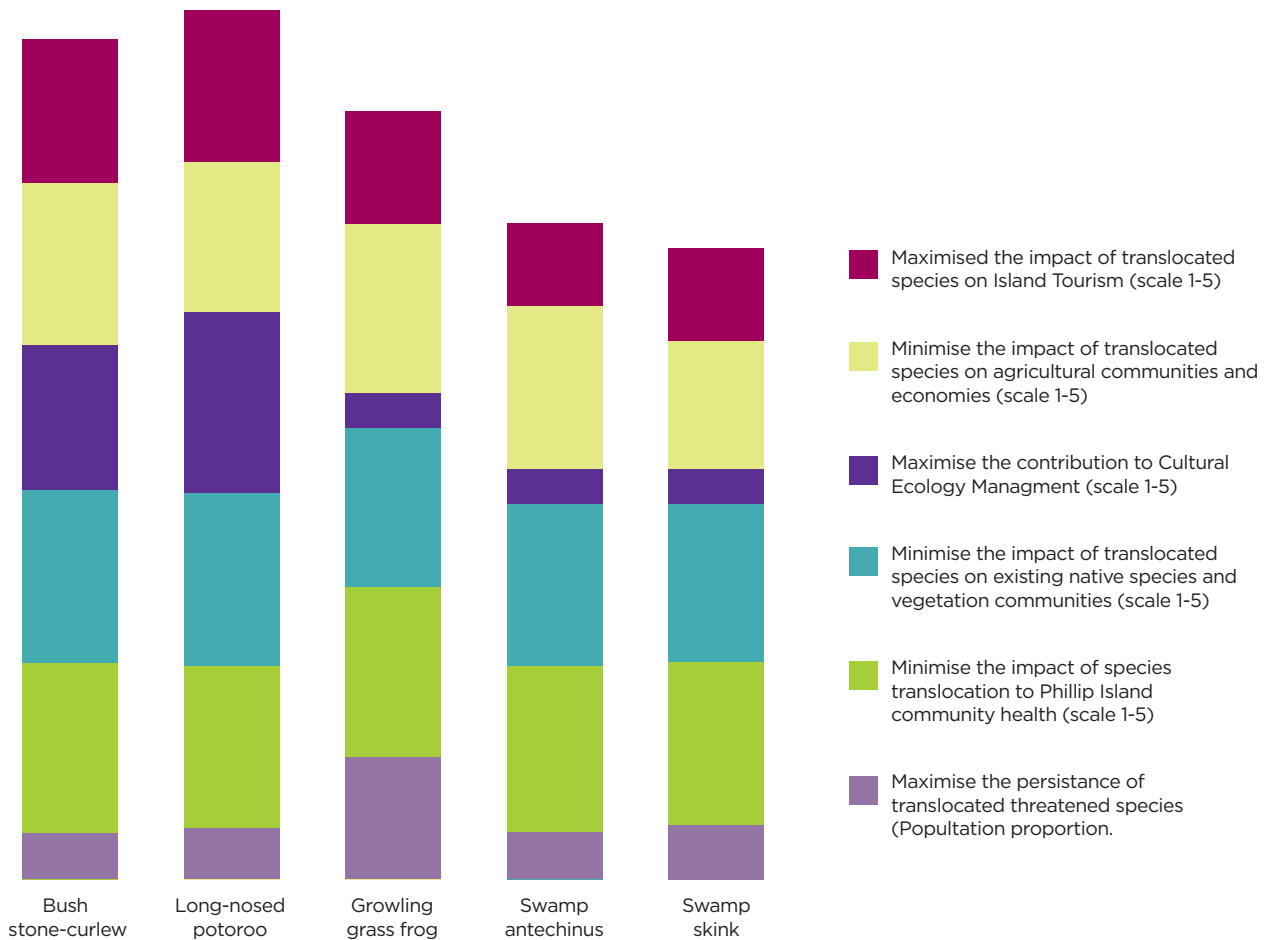
Identified key objectives were:

- 1. Maximise the persistence of translocated threatened species.** This captures the likelihood that the translocated species will succeed on Phillip Island (Millowl) within five years of translocation.
- 2. Minimise the impact of species translocations to Phillip Island’s (Millowl’s) community health.** This includes community health impacts such as car accidents caused by wildlife on roads and illnesses, injuries or fatalities due to translocated species.
- 3. Maximise the contribution to Cultural Ecology Management.** This ensures translocated species have significance to the Traditional Custodians of Millowl, the Bunurong Peoples.
- 4. Minimise the impact of translocated species on existing native species and vegetation communities.** This includes population level impacts to penguins, loss of flora recruitment, changes to soil disturbance and decline in threatened species populations.
- 5. Minimise the impact of translocated species on agricultural communities and economies.** This addresses the concerns around species that would target crop species, undertake significant burrowing and tunnelling, potentially introduce illness to cattle or may have uncontrolled population size.
- 6. Maximise the impact of translocated species on Island tourism.** This addresses how tourism would benefit through threatened species that have some level of visibility and provide the opportunity for visitor experiences.



Structured Decision Making

This process strengthened relationships between Nature Parks staff, the local community and regional stakeholder groups and resulted in a robust and defensible approach to planning for threatened species reintroductions. Importantly, this participatory decision making approach facilitates the ongoing collaboration and cooperation between stakeholders to assist in effective future decision making.



Structured Decision Making workshop example

Figure 2: The overall decision scores, which indicate the Long-nosed potoroo as the highest performing alternative. The coloured bars highlight the contribution of each objective to the total decision scores.



Short listing of priority species

The Nature Parks' Conservation Team worked closely with Island stakeholders and threatened species experts to assess the suitability of ten potential species that are all regionally threatened but represented a range of taxonomic groups and ecological roles. The species considered were:

1. Bush stone-curlew
2. King quail
3. Long-nosed potoroo
4. Swamp antechinus
5. Masked owl
6. Southern bettong
7. Growling grass frog
8. Eastern quoll
9. Swamp skink
10. Lace monitor

The short-listing process was guided by:

- Conservation status
- Historical distribution
- Habitat/resources suitability
- Representation of animal class
- Role in ecosystem function

Species not short-listed for consideration in this process were either:

- Represented by a 'similar' species for example the Southern brown bandicoot is similar taxonomically and functionally to the recently translocated Eastern barred bandicoot
- Deemed unsuitable for translocation to Phillip Island (Millowl).

The number of species considered was constrained to ensure the short-listed species could be considered fully, but this does not preclude other threatened species from being considered in the future. The prioritising of these species was multi-faceted and based on each species' potential to contribute to re-establishing ecological functions and interactions on Phillip Island (Millowl) to facilitate future translocations.

From this process, we determined a short-list of five of the highest scoring threatened species.

This list comprises our Threatened Species Prospectus which is recognised in our 30-Year Conservation Vision - *Beyond the Horizon* and 5-Year Conservation Plan 2019-2023.

1. Bush stone-curlew *Burhinus grallarius*
2. Long-nosed potoroo *Potorous tridactylus tridactylus*
3. Growling grass frog *Litoria raniformis*
4. Swamp skink *Lissolepis coventryi*
5. Swamp antechinus *Antechinus minimus maritimus*

PRIORITY SPECIES

The team then short-listed the proposed species to identify the top two priority species for reintroduction within the next five years, these being the:

1. Bush stone-curlew
2. Long-nosed potoroo



Proposed calendar of key activities

Timelines can be adjusted according to: available resources, social engagement, and appropriate environmental conditions. Budgets are addressed at an organisational level.

	2018	2019				2020				2021				2022				2023			
	Spr	Sum	Aut	Win	Spr	Sum	Aut	Win	Spr	Sum	Aut	Win	Spr	Sum	Aut	Win	Spr	Sum	Aut	Win	Spr
Threatened Species Plan development	█	█	█	█	█																
Stakeholder engagement	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Intense threat control		█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
EBB monitoring	█		█		█		█		█		█		█		█		█		█		█
Hooded plover work	█	█			█	█			█	█			█	█			█	█			█
GGF monitoring	█	█			█	█			█	█			█	█			█	█			█
BSC prep and approvals	█	█	█	█	█	█				█	█			█	█			█	█		
BSC release												█	█			█	█			█	█
BSC monitoring												█	█	█	█	█	█	█	█	█	█
Fungi and flora surveys	█	█		█	█			█	█			█	█			█	█			█	█
Flora Management Plans developed	█	█	█	█																	
Flora Management Actions undertaken				█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Second species prep and approvals														█	█				█	█	
Second species release																	█				█
Camera monitoring (TS & Pest)	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█



Acknowledgements

Phillip Island Nature Parks would like to thank the following key stakeholders for their participation and significant contribution to the development of this Threatened Species Plan by attending Key Stakeholder Workshops:

- Bass Coast Shire Council
- Bass Coast Landcare Network
- Bunurong Land Council Aboriginal Corporation
- Department of Land Water and Planning (DELWP)
- Destination Phillip Island
- Office of the Threatened Species Commissioner
- Peter Menkhorst
- Phillip Island Better Beef Group
- Phillip Island Conservation Society
- Phillip Island Nature Parks
- Phillip Island landholders
- Port Phillip and Westernport Catchment Management Authority (PPWCMA)
- Westernport Water
- Zoos Victoria

PHILLIP ISLAND NATURE PARKS STEERING COMMITTEE

- Jessica McKelson, Conservation Manager
- Dr Peter Dann, Research Director
- Dr Duncan Sutherland, Deputy Research Director
- Ben Thomas, Ranger in Charge
- Richard Faulkner, Threatened Species Planner
- Thomas Nixon, Threatened Species Officer
- Sally O'Neill, Community Engagement Officer

THANK YOU

- Aboriginal and Torres Strait Islander Community
- Centre for Environment and Economic Research, The University of Melbourne
- Moonlit Sanctuary
- Nature Conservation Working Group
- NSW Murray Catchment Local Land Services
- Cape Barren Geese Working Group
- Mulligans Flat Woodland Sanctuary (ACT)
- Zoos Victoria



Appendices

THREATENED SPECIES OF PHILLIP ISLAND (MILLOWL) - 2018

Explanation of Listing and Status

Conservation Status in Victoria (DEPI - Advisory List)

EXTINCT (EX)

A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual) and throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

REGIONALLY EXTINCT (RX)

As for Extinct but within a defined region (in this case the state of Victoria) that does not encompass the entire geographic range of the taxon. A taxon is presumed Regionally Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout the region have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

EXTINCT IN THE WILD (EW)

A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

CRITICALLY ENDANGERED (CR)

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (IUCN Standards and Petitions Subcommittee 2010), and it is therefore considered to be facing an extremely high risk of extinction in the wild.

ENDANGERED (EN)

A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (IUCN Standards and Petitions Subcommittee 2010), and it is therefore considered to be facing a very high risk of extinction in the wild.

VULNERABLE (VU)

A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (IUCN Standards and Petitions Subcommittee 2010), and it is therefore considered to be facing a high risk of extinction in the wild.

NEAR THREATENED (NT)

A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for, or is likely to qualify for, a threatened category in the near future.

DATA DEFICIENT (DD)

A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate.



Appendices

Conservation Status in Australia (EPBC Act)

The 'EPBC' column outlines the national conservation status of the taxon under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). In some instances the scientific and/or the common names of animals may have changed since the taxon was first listed under the EPBC Act. In such instances the EPBC Act status has been applied to the circumscription intended at the time of listing under the Act. This information is accurate at January 2013. For further information regarding the EPBC Act and, in particular, for the most up-to-date listings under the Act, refer to the following web site: www.environment.gov.au/epbc/

The EPBC Act categories are as follows:

EXTINCT (EX)

A taxon is extinct when there is no reasonable doubt that the last individual of the taxon has died.

CRITICALLY ENDANGERED (CR)

A taxon is critically endangered when it is facing an extremely high risk of extinction in the wild in the immediate future.

ENDANGERED (EN)

A taxon is endangered when it is not critically endangered but is facing a very high risk of extinction in the wild in the near future.

VULNERABLE (VU)

A taxon is vulnerable when it is not critically endangered or endangered but is facing a high risk of extinction in the wild in the medium-term future.

CONSERVATION DEPENDENT (CD)

A taxon is conservation dependent when it is the focus of a specific conservation program, the cessation of which would result in the taxon becoming vulnerable, endangered or critically endangered within a period of five years

Listing under the *Flora and Fauna Guarantee Act 1988* (FFG Act)

The 'FFG' column provides information on listing status under the provisions of Part 3 of the Victorian Flora and Fauna Guarantee Act 1988 (FFG Act). A taxon may be listed as threatened if it has been nominated, assessed by the Scientific Advisory Committee (SAC) and approved by the Minister for Environment and Climate Change and the Minister for Agriculture and Food Security. Any person may make a nomination for listing. This information is accurate as at January 2013. For the most up-to-date listings under the Act, refer to the following website: www.dse.vic.gov.au

The FFG Act categories are as follows:

LISTED (L)

Listed as threatened

NOMINATED (N)

Nominated for listing as threatened but has not yet been listed. In some cases, the taxon may have received a preliminary or final recommendation indicating that it is eligible or ineligible for listing. In other cases, the nomination might not yet have been considered.

INVALID OR INELIGIBLE (I)

Nominated but rejected for listing as threatened on the basis that the taxon was considered to be invalid (either undescribed or not widely accepted) or ineligible (taxon does not satisfy any of the primary listing criteria) by the SAC.

DELISTED (D)

Previously listed as threatened but subsequently removed from the Threatened List following nomination for delisting.



Appendices

Threatened Terrestrial Vertebrate Species of Victoria that were recorded previously on Phillip Island (Millowl), or recorded nearby with potential for translocation.

COMMON NAME	SCIENTIFIC NAME	STATUS		
		EPBC	FFG	DEPI
MAMMALS				
Long-nosed potoroo	<i>Potorous tridactylus tridactylus</i>	VU	L	NT
Swamp antechinus	<i>Antechinus minimus maritimus</i>	VU	L	NT
Southern brown bandicoot	<i>Isoodon obesulus obesulus</i>	EN	L	NT
Long-nosed bandicoot	<i>Perameles nasuta</i>	-	-	-
New holland mouse	<i>Pseudomys novaehollandiae</i>	-	L	V
Swamp rat	<i>Rattus lutreolus</i>	-	-	-
Bush rat	<i>Rattus fuscipes</i>			
Eastern quoll	<i>Dasyurus viverrinus</i>	-	L	RE
White footed dunnart	<i>Sminthopsis leucopus</i>	-	L	NT
Southern bettong	<i>Bettongia gaimardi</i>			
Brush-tailed phascogale	<i>Phascogale tapoatafa tapoatafa</i>		L	V
BIRDS				
Bush stone-curlew	<i>Burhinus grallarius</i>	-	L	EN
Southern emu wren	<i>Stipiturus malachurus</i>	EN	-	-
King quail	<i>Coturnix chinensis victoriae</i>	-	L	EN
Masked owl	<i>Tyto novaehollandiae novaehollandiae</i>	-	L	EN
REPTILES				
Swamp skink	<i>Lissolepis coventryi</i>	-	L	V
Glossy grass skink	<i>Pseudemoia rawlinsoni</i>	VU		
Lace monitor	<i>Varanus varius</i>	-	-	EN
AMPHIBIANS				
Growling grass frog	<i>Litoria raniformis</i>	VU	L	EN
Southern toadlet	<i>Pseudophre semimarmrata</i>	VU		



Appendices

Vulnerable, Rare or Threatened Plant species that occur on Phillip Island (Millow)

COMMON NAME	SCIENTIFIC NAME	STATUS		
		EPBC	FFG	DEPI
Large leaf cinnamon wattle	<i>Acacia leprosa</i> var. <i>uninervia</i>			r
Sea nymph	<i>Amphibolis antarctica</i>			k
River swamp wallaby grass	<i>Amphibromus fluitans</i>	VU	X	
Wavy swamp grass	<i>Amphibromus sinuatus</i>			v
Wallaby-grass	<i>Rytidosperma caespitosum</i>			
Shore spleenwort	<i>Asplenium obtusatum</i> subsp. <i>northlandicum</i>			v
Glistening saltbush	<i>Atriplex billardierei</i>		L	x
Marsh Saltbush	<i>Atriplex paludosa</i> subsp. <i>paludosa</i>			r
Grey mangrove	<i>Avicennia marina</i> subsp. <i>australasica</i>			r
Water parsnip	<i>Berula erecta</i>			k
Sand brome	<i>Bromus arenarius</i>			r
Slender pink fingers	<i>Caladenia vulgaris</i>			r
Slender bitter cress	<i>Cardamine tenuifolia</i>			e k
Fringed midge-orchid	<i>Corunastylis ciliata</i>			k
Southern blue gum	<i>Eucalyptus globulus</i> subsp. <i>globulus</i>			r
Coast ballart	<i>Exocarpos syrticola</i>			r
Pale-flowered cranesbill	<i>Geranium sp3</i>			r
Oval sea wrack	<i>Halophila australis</i>			k
Australian grass wrack	<i>Heterozostera nigricaulis</i>			r
Creeping rush	<i>Juncus revolutus</i>			r
Purple blowgrass	<i>Lachnagrostis punicea</i> subsp. <i>filifolia</i>		L	v
Salt lawrenca	<i>Lawrenca spicata</i>			r
Leafy peppergrass	<i>Lepidium foliosum</i>			v
Hoary rapier- sedge	<i>Lepidosperma canescens</i>			r
Crimson berry	<i>Leptecophylla juniperina</i> subsp. <i>oxycedrus</i>			v
Yellow sea lavender	<i>Limonium austral</i> var. <i>australe</i>			r
Austral trefoil	<i>Lotus australis</i> var. <i>australis</i>			k
Giant honey-myrtle	<i>Melaleuca armillaris</i> subsp. <i>armillaris</i>			r
Currant wood	<i>Monotoca glauca</i>			r
Peninsula daisy bush	<i>Olearia sp2 aff.lanuginosa</i>			r
Dune wood sorrel	<i>Oxalis rubens</i>			r
Coast dwarf poa	<i>Poa halmaturina</i>			v
Dune poa	<i>Poa poiformis</i> var. <i>ramifer</i>			r
Leafy wallaby grass	<i>Rytidosperma bipartita</i> formerly <i>Austrodanthonia bipartita</i>			
Coast saltwort	<i>Salsola tragus</i> subsp. <i>pontica</i>			r
Beaded glasswort	<i>Sarcocornia quinqueflora</i> subsp. <i>tasmanica</i>		I	k
Merran's sun orchid	<i>Thelymitra X merraniae</i>		L	e
One flower early Nancy	<i>Wurmbea uniflora</i>			r



Related links

- 2019 report for the Intergovernmental Science-policy Platform on Biodiversity and Ecosystem Services (IPBES) <https://www.ipbes.net/news/ipbes-global-assessment-summary-policymakers-pdf>
- Australian Federal Government, Threatened Species Strategy - <http://www.environment.gov.au/ts-strategy>
- DELWP Biodiversity 2037 Implementation Plan - 2018 https://www.environment.vic.gov.au/__data/assets/pdf_file/0022/51259/Protecting-Victorias-Environment-Biodiversity-2037.pdf
- DELWP Living with Wildlife Action Plan https://www.wildlife.vic.gov.au/__data/assets/pdf_file/0019/112429/DEWLP_LivingWithWildlife-ActionPlan_www.pdf
- Global Warming of 1.5 °C - an IPCC special report: <https://www.vox.com/2018/10/5/17934174/climate-%20change-global-warming-un-ipcc-report-1-5-degrees%20> <https://www.vox.com/2018/10/5/17934174/climate-change-global-warming-un-ipcc-report-1-5-degrees>
- IUCN Species Survival Commission Reintroduction Specialist Group Guidelines for Reintroductions and Other Conservation Translocations: <https://portals.iucn.org/library/sites/library/files/documents/2013-009.pdf>
- (IUCN/SSC 2013). IUCN/SSC Reintroduction Specialist Group Reintroduction Guidelines 2013 <https://iucn-ctsg.org/wp-content/uploads/2017/12/new-rsg-reintro-guidelines-2013.pdf>
- Victorian Marine and Coastal Council: Climate change and the coast: <https://www.marineandcoastalcouncil.vic.gov.au/resources/vmacc-reports>
- WWF Living Planet Report 2018 https://wwf.panda.org/knowledge_hub/all_publications/living_planet_report_2018/



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The majestic Cape Woolamai surrounded by Bass Strait and Western Port Image: Brian Thorne





