The effectiveness of threatened species and ecological communities' protection in Australia

Submission to Senate Inquiry

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The critical role of island invasive vertebrates in the extinction of Australian island species

Islands are at the centre of the current global extinction crisis. While they only make up 5% of the earth's surface islands support 20% of all biodiversity, including a disproportionately high number of endemic species (that is, plants and animals that live nowhere else). Islands are home to 45% of IUCN Red List endangered species, the majority of which are principally threatened by invasive species.

Islands are critical habitat for 31% of Australia's critically endangered and endangered fauna, and for 37% of the vulnerable fauna, including many endemics. Overall, 111 threatened fauna species occur on Australia's islands, out of a national total of 325 (35%). A high proportion of these species are directly threatened with extinction by one or more invasive species.

Island-specific biosecurity approaches is one essential measure to slow Australia's on-going extinction rate (e.g. Nias et al., 2010). There is more than sufficient justification for the Australian Government to take a leadership role in developing a nationally-consistent approach to island biosecurity. Of the 8,300 islands in Australia, the vast majority are directly relevant to one or more Matters of National Environmental Significance under the *Environment Protection and Biodiversity Conservation Act 1999*. A search of the Department of Environment, Heritage and the Arts SPRAT database with the term "island" revealed at least 90 listed threatened species (excluding extinct species). Numerous islands are also either within Australian World Heritage Properties, a Commonwealth Territory, or are wholly or partly covered by a Commonwealth protected area. Many islands are also important to matters covered by the EPBC Act including nationally threatened species and ecological communities, migratory species and marine species, Threat Abatement Plans and Recovery Plans. Many islands contain critical habitats for one or more species listed under various international agreements to which Australia is a signatory.

Despite their obvious importance to threatened species and biological diversity, islands (and in particular Australia's Overseas Territories) are neglected in terms of Commonwealth conservation action. The most recent example is the extinction of the Christmas Island Pipistrelle, a small bat endemic to Christmas Island. Despite being under the direct management of the Commonwealth and occurring in a Commonwealth National Park, the bat is now the first mammalian extinction in Australia in 60 years (Flannery 2012).

Where invasive species are present on islands, the best option is their compete removal (eradication).

In the past decades there have been abundant examples that demonstrate that on islands the complete removal of invasive alien vertebrates (such as feral cats and rats) is a preferable strategy to on-going control in preventing extinction of island species (Veitch et al., 2011).

In summary, the role of eradication as a tool for conservation is:

- To remove immediate threats to species at risk of extinction
- To enhance biosecurity by removing future threats at the earliest stages
- To build resilience in species through increasing population numbers and restoring species distributions
- To restore ecosystem function on islands and build resilience to climate change and other threats
- To remove threats to human health, food security and livelihoods that may arise (such as disease, environmental exposure to ongoing use of toxins, damage to agricultural crops)
- To provide more humane and environmentally benign alternative to ongoing lethal control methods.

Eradication of non-indigenous species from islands is possible. Six species - Black Rat (*Rattus rattus*), House Mouse (*Mus musculus*), Rabbit (*Oryctolagus cuniculus),* Red Fox (*Vulpes vulpes*), feral Cat (*Felis catus*) and Goat (*Capra hircus*) - have been eradicated from more than 50 Australian islands and more eradication projects are planned.

Exotic rodents on Australian islands

Australia has over 8300 islands under 100 000 ha, of which at least 133 are now known to have one or more species of exotic rodents. In 2006 the Australian Government listed exotic rodents on islands as a key threatening process under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) and initiated the development of a threat abatement plan for rats and mice on islands less than 100 000 ha in area. This plan and its background document provide a national framework to guide and coordinate Australia's management of exotic rodents on islands to remove, mitigate and prevent their impacts on native species and ecological communities.

The four exotic rodent species in this threat abatement plan have variously invaded over 80% of the world's major island archipelagos, and have been responsible for many of the extinctions and ecosystem changes that have occurred on these important fragments and refuges for biodiversity. To date, invasive rodents have been eradicated from 350 islands in 21 countries around the world.

In fact Australia is a world leader in the eradication of invasive species from islands at risk from rodents.

- On Macquarie Island, seabirds are directly threatened by rats and (potentially) mice (and indirectly through habitat degradation by rabbits) and the current eradication project represents one of the most significant island conservation efforts undertaken globally. There is huge interest and support for this project world-wide.
- On Lord Howe Island, five species of birds and at least 13 species of invertebrates are already extinct due to rodents. The planned eradication of rodents from Lord Howe Island (also World Heritage listed), will be a globally significant project that will set new international benchmarks for island conservation.

Despite the relatively high up-front costs of these major eradication projects, the conservation benefits (including the prevention of extinctions and protection of World Heritage values) far outweigh these costs. In financial terms a one-off eradication is almost certainly much less expensive than ongoing labor intensive control approaches that may need to be conducted in perpetuity to protect the species and values (including any impacts on humans) at risk.

Why a specific and targeted program for island conservation would assist in reducing Australia's extinction rate.

Australia is a world leader in island eradications, but major opportunities and challenges remain.

Major changes have occurred on most Australian islands in the past 200 years at least. Extensive habitat loss, fragmentation and on-going degradation, coupled with the impacts of weeds and invasive vertebrate and invertebrate animals undoubtedly present the greatest threats to the continued survival of island flora and fauna.

The arrival of invasive alien species such as rats, cats, ants and weeds where they have been previously absent has had profound impacts on islands around the world. The majority of all recorded extinctions have taken place on islands. Many of these extinctions are directly attributable to the impacts of invasive vertebrate predators and competitors, such as rats, cats and pigs.

Climate change is likely to lead to further changes and, perhaps, additional environmental stress. While most species may be able to adapt to the predicted changes, small forest remnants could be sensitive to extreme weather events and invasive species may be better-adapted than native species to establish and spread under different conditions.

The case of Norfolk Island

The case of Norfolk Island dramatically exemplifies the central weakness of the current approach to threatened species conservation in Australia, as well as the potential benefits of an island eradication approach to invasive species.

Norfolk Island is an external territory of Australia around 1700 km north-east of Sydney. The Group comprises the main island of Norfolk and two smaller islands, Nepean Island and Phillip Island, and a number of small offshore islets and stacks. Since 1914, Norfolk Island has been governed under the authority of the Commonwealth of Australia and was granted partial self-government in 1979.

Under the Norfolk Island Act 1979 (Cth) the Norfolk Island Legislative Assembly is able to enact laws on a broad range of subjects including environmental matters.

Norfolk Island is ranked as number 11 in the world's 'top 20' islands, with areas <1000km^2, ranked in terms of conservation benefit to threatened birds arising from the eradication of alien vertebrates from those islands (Brooke et al., 2007). Despite extensive habitat loss, the extinction of a number of species and apparent declines in many others, Norfolk Island is still an internationally important island for biodiversity. Threatened species listed under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) comprise 46 plant species, five species of land snails, five bird species and two reptiles.

There are a number of factors that ought to lead to the biodiversity of Norfolk Island being well protected:

- Threatened vertebrate species on Norfolk are highly dependent on a small (460ha) Commonwealth National Park (Norfolk Island National Park).
- There is a comprehensive and recent threatened species recovery plan (2010) which outlines specific actions for 58 species listed under the EPBC Act.
- The main threats to the vertebrate biodiversity (specifically predation by rodents and cats) are well recognised in a number of threat abatement plans.
- There is an NRM plan that highlights threatened species actions and the potential for restoration of biodiversity on NI, although Norfolk is not within an NRM region.
- There are many decades of research and experience upon which threatened species recovery can be based.
- Logistical challenges to threatened species conservation do not seem insurmountable.
- Finally, conservation of threatened species on Norfolk does not represent any threat to commercial interests (an in fact is likely to benefit the main industry – tourism).

Virtually all of the conditions for successful recovery of threatened vertebrate species therefore seem to be in place; and yet the decline of Norfolk Island species continues. At least one species appears to have gone extinct in recent decades – the White-chested White-eye (Dutson, 2012) and another species may be headed for extinction within a few years – the Tasman parakeet (Garnett et al., 2011). In addition there are 56 other EPBC listed species on an island that is about 35 km^2, an area smaller than the combined area of Canberra Nature Park. So why is Norfolk Island's biodiversity still at such risk?

The Norfolk Island Natural Resource Management Plan (2009) noted that a key threat to the islands natural resources and environment "is the lack of cooperative and effective management of the environment" a situation they noted had been evident since 2000.

Based on an assessment conducted by Island Conservation in March 2012, some relevant administrative and funding factors in the on-going decline of Norfolk Island biodiversity include:

- Very low levels of environmental management capacity on NI (both within the NI Territory Government and Parks Australia) with a consequence that there is an inability to implement any more than a small fraction of the management actions as described in the Threated Species Recovery Plan or NRM plan, including the protection of Tasman parakeets and other threatened species.

- Almost no additional funding has been provided outside of the NINP operating budget for any threatened species conservation in recent years.

- Norfolk does not "fit" into the Australian NRM region system and therefore does not receive NRM baseline funding.

- There is little capacity on NI to even apply for funding from Commonwealth sources. The application process is cumbersome and in most cases does not even recognise Norfolk Island as a region.

- Norfolk Island (and indeed all of Australia's overseas territories) never appears in Commonwealth Government environmental priorities (for example the recent One Land – Many Stories: Prospectus of Investment, Australian Government, Department of Sustainability, Environment, Water, Population and Communities, Canberra.).

However, above all else, the most significant factor in the ongoing decline of biodiversity on Norfolk Island is the lack of resources to adequately protect threatened endemic species (including birds, reptiles and invertebrates) from the impacts of feral predators and competitors.

For example:

- Black rats and Polynesian rats have been implicated in the decline of the Tasman parakeet, golden whistler, scarlet robin, burrow-nesting seabirds, reptiles and invertebrates. Rats have also been identified as a threat to four threatened plant species. While some rat control does occur, it is not clear how effective this is in reducing rat numbers to levels that do not threaten susceptible species.

- Feral cats are implicated in the decline of the Norfolk boobook owl, Tasman parakeet, Golden whistler, scarlet robin, most nesting seabirds and the two reptiles. The only cat control is carried out by a small volunteer group and anecdotal evidence suggests that feral cat numbers have increased significantly in recent years.

- Several introduced birds have increased appreciably in numbers in recent years, including the Crimson rosella which has been implicated as a competitor for nests with the Tasman parakeet, and the European starling and feral chickens. Efforts to control or limit the damage caused by crimson rosella seem to have ceased and anecdotal evidence suggest a significant recent increase in numbers.

- The Asian house gecko has also established at several sites around the island recently. If this species were to find its way to Phillip Island it could have serious implications for the rare lizards found there. The threats this species poses are not clear, although any risk assessment would be likely to favour eradication of this alien species as soon as possible. There does not seem to be any biosecurity arrangement that would either prevent the arrival of house gecko on Philip Island, nor is there any plan to detect and remove any that may exist now.

- Several pathogens have also been reported on the island, including "beak and feather" disease which was probably responsible for the deaths of many Tasman parakeets in the 1970s. It is not clear what, if anything is being done about this threat.

- The unique and iconic Norfolk Island pine is classified as a threatened species (Vulnerable) by the IUCN. A root-rotting fungal disease that is a threat to Norfolk Island's pines and other native plants is exacerbated by low levels of soil phosphorous – highlighting the link between the loss of nesting seabirds and the health of the island's ecosystem.

- The only burrow-nesting seabird still breeding on Norfolk Island in numbers is the wedge-tailed or Pacific shearwater. While there are no recent estimates of numbers it has been suggested that the population has declined in recent decades as a result of feral cat predation at breeding colonies. Cats also probably kill most of the smaller numbers of little shearwaters and black-winged petrels that attempt to nest here. Failure to eradicate feral cats will continue to prevent the establishment of more extensive seabird breeding and hence the flow of marine nutrients into the island ecosystem. Failure to eradicate cats also inhibits the successful recovery of threatened seabirds that formerly nested on Norfolk.

The specific case of the Tasman parakeet: once saved from extinction and now back on the Critically Endangered list

The Tasman parakeet *Cyanoramphus cookii* (or "Green parrot") was rescued from the brink of extinction in the early 1980s, but is once again believed to be at immediate risk of extinction. The Action Plan for Australian Birds (Garnett et al., 2011) lists the Tasman parakeet on Norfolk Island as Critically Endangered. The population recovered from near extinction in the early 1980s as a result of management actions to between 50 and 240 birds in 2009. However, there are concerns that on-going rat and cat predation and competition with the introduced Crimson rosella for nesting hollows, may again be causing a serious decline in numbers and there is an urgent need to provide a much more precise estimate of the total population size.

Even at the higher end of the population estimates the Tasman parakeet remains extremely vulnerable to extinction over a short period of time. A combination of predation, competition for nest-hollows, disease and variability in food supply could all act to drive this species to unsustainably low population numbers and require the re-establishment of the expensive emergency measures initiated prior to 2009.

The establishment of an integrated approach to biosecurity (the prevention, control and eradication of invasive pests) on Norfolk Island is one example of how a specific focus on high biodiversity islands would dramatically improve the prospects of survival for threatened species.

Despite the creditable achievements of the past, and some limited programs within the National Park and some Public Reserves, there is little information available about progress in addressing declines of forest birds and other native species on Norfolk Island. It appears that monitoring of rats and feral cats, and of Tasman parakeets and other species, is no longer rigorous enough to provide reliable information on the status of native species, or their threats. Greater effort is needed to gather such information, and to revitalise species recovery and pest management programs.

Island Conservation (see Appendix A) has argued that the Commonwealth Government and the Norfolk Island Administration consider the following actions as part of an integrated approach to restoring the biodiversity of Norfolk Island.

- Given the difficulties faced by an Australian territory that is not part of an Australian NRM region and the considerable difficulty that island residents face in applying for funds from the Commonwealth, a specific Norfolk Island Biodiversity Rescue Package should be created. It is suggested than an amount of $5million over 5 years is used to fund projects developed and implemented by the island community under a strategic plan for island restoration.

- Funding should immediately be increased to enable adequate management of invasive species threats on Norfolk Island with particular focus on invasive species within the NINP.

- Planning commence for an island-wide feral cat and rodent eradication program starting with funding for a full-scale feasibility study commencing in 2013.

- A statement of support, in principle, should be declared jointly by the Commonwealth Government and the Norfolk Island Administration to more effectively protect Norfolk Island's remaining biodiversity through the joint implementation of the Norfolk Island Threatened Species Recovery Plan.

- A statement of support, in principle, should be declared jointly by the Commonwealth Government and the Norfolk Island Administration to support economic stimulus and employment through targeted programs for "green" economic development.

- A workshop should be convened on Norfolk Island as soon as possible to discuss the need for a cooperative conservation program. The focus of this meeting should be to facilitate agreement amongst key stakeholders to a vision for Norfolk Island which incorporates ecological, social and economic needs. A process for engaging stakeholders in developing and implementing an integrated conservation strategy should also be determined.

- Potential (local, national and international) donors and other contributors should be identified who may wish to participate in a revitalised Norfolk Island conservation program. Their participation at the workshop should be facilitated.

- A governance structure and processes through which information will be gathered and disseminated, decisions made, resources allocated and tasks defined will need to be determined. This may involve a group with executive powers, supported by one or more advisory groups.

- Island-wide surveys and censuses should be undertaken as soon as possible to gain a clearer picture of the current distribution and numbers of as many plants and animals as possible, including threatened native species and introduced species. Selected monitoring programs should be appropriately supported and maintained.

- Reviews of species recovery projects and the Phillip Island restoration program, and associated weed and pest control programs, should be commissioned, to identify any necessary improvements or requirements for additional support. New plans should be prepared, as appropriate, to inform strategic decisions and to guide management actions.

- A research plan should be prepared and priority research projects initiated to underpin conservation decision making.

- A communication plan may also be required to ensure local residents, management agencies, donors and other stakeholders have access to current information and are able to influence decisions and to contribute to prescribed actions.

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Building on the past to preserve the future – some issues and options for biodiversity conservation on Norfolk Island

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ISLAND CONSERVATION

Preventing Extinctions

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Introduction

The Norfolk Island Group, consisting of Norfolk, Phillip and Nepean Islands, and a number of smaller islets and stacks, is an internationally important biodiversity "hotspot". It is also home to about <1800 people who rely heavily on tourism for their livelihoods. Despite important biodiversity conservation achievements, including the establishment of the Norfolk Island National Park, the eradication of rabbits from Phillip Island and averting the imminent extinction of the Tasman parakeet, there are concerns that populations of native plants and animals continue to decline, perhaps leading to further extinctions. We were asked by the Norfolk Island Flora and Fauna Society to offer some general observations about conservation needs and opportunities, and to suggest new directions which might be considered by stakeholders, decision makers and others with an interest in preserving Norfolk Island's natural heritage. The following comments are based on our visit and some meetings with local people, and a preliminary review of available literature, and should not be taken as a comprehensive evaluation. These comments are necessarily general and brief. We would be happy to expand on specific points and would welcome any opportunity to contribute to discussions which may arise from them.

Norfolk Island: a brief background

- Norfolk Island is an external territory of Australia around 1700 km north-east of Sydney. The Group comprises the main island of Norfolk and two smaller islands, Nepean Island and Phillip Island, and a number of small offshore islets and stacks.
- The island has a long and fascinating human history stretching from early evidence of Polynesian visitors through to being used for a settlement and later as a penal colony by the British and, in 1856, being settled by people from Pitcairn Island.
- Since 1914, Norfolk Island has been governed under the authority of the Commonwealth of Australia and was granted partial self-government in 1979. Under the Norfolk Island Act 1979 (Cth) the Norfolk Island Legislative Assembly is able to enact laws on a broad range of subjects including environmental matters.
- The Norfolk Island Government is primarily responsible for the delivery of government services on the Island. The Norfolk Island Parks and Forestry Service is the government body responsible for environmental and land management matters outside of the national park, including management of reserves.

Isolation, endemism and vulnerability are key features of island biodiversity.

- Islands are at the centre of the current global extinction crisis. While they only make up 5% of the earth's surface islands support 20% of all biodiversity, including a disproportionately high number of endemic species (that is, plants and animals that live nowhere else).
- Because of their isolation oceanic islands have unique biotas. The Norfolk Island Group is recognised internationally as an important biodiversity conservation site, in part, because it is one of a few oceanic islands which exist in the subtropical zone (between temperate and tropical latitudes.

- Islands typically feature high levels of endemism. Unfortunately island endemics are especially vulnerable to induced environmental changes. The small size of many island populations may increase the risk of their extinction.
- Major changes have occurred in the Norfolk Island Group following human colonisation. Extensive habitat loss, fragmentation and on-going degradation, coupled with the impacts of weeds and invasive vertebrate and invertebrate animals undoubtedly present the greatest threats to the continued survival of Norfolk Island's native flora and fauna.
- Large areas of forest on Norfolk Island have been cleared for farming, forestry or urban development, leaving a patchwork of small, modified forest remnants. A little over 460 hectares of native forest is protected within the Norfolk Island National Park. This is the largest remaining area of relatively intact native forest on the island.
- Climate change is likely to lead to further changes and, perhaps, additional environmental stress. While most species may be able to adapt to the predicted changes, small subtropical forest remnants could be sensitive to extreme weather events and invasive species may be better-adapted than native species to establish and spread under different conditions

Norfolk Island is internationally recognised for its biodiversity values, but these values are at risk.

- The Norfolk Island Group is an important breeding site for many thousands of seabirds, some of which breed at few other places. Both Norfolk Island and Phillip Island have been designated as Important Bird Areas by Birdlife International on the basis of threatened endemic species and seabird numbers. It has also been identified as an Endemic Bird Area recognising that eight endemic forest birds are present. A further 7 have gone extinct since European colonisation. It has recently been suggested that another forest bird, the White-chested White-eye is now 'presumed extinct' (Dutson, 2012).
- The Action Plan for Australian Birds (2010) lists the Tasman parakeet (or "Green parrot") as Critically Endangered. The population recovered from near extinction in the early 1980s as a result of management actions to as many as 240 or more in 2009. However there are concerns that on-going rat and cat predation and competition with the introduced Crimson rosella for nesting hollows may again be causing a serious decline in numbers. The conservation status of other forest birds such as the Southern boobook and Pacific robin is also uncertain.
- Other native animals include 2 endemic lizards – now limited to Phillip Island and other outliers in the Group, and 2 species of bats – which also seem to have disappeared relatively recently. There is a rich invertebrate fauna including land-snails, cockroaches and beetles, and an endemic cricket and centipede.
- More than 180 species of native plants have been identified, with about a quarter of these being endemic. More than double this number of introduced plants is present, including some such as African olive, cherry guava and Hawaiian holly which are invasive weeds.
- Threatened species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) comprise 46 plant species, five species of land snails, five bird species and two reptiles.

- Norfolk Island is ranked as number 11 in the world's 'top 20' islands, with areas <1000km^2, ranked in terms of conservation benefit to threatened birds arising from the eradication of alien vertebrates from those islands (Brooke et al., 2007). Despite extensive habitat loss, the extinction of a number of species and apparent declines in many others, Norfolk Island is still an internationally important "biodiversity hotspot".

- Norfolk Island is part of a natural group of islands in the Southwest Pacific that share a number of bird species with the Lord Howe Island Group, and the Kermadec Islands of New Zealand. It has been suggested that the successful eradication of invasive predators from these islands would be beneficial to the seabirds and forest birds that currently or previously inhabited these islands. There are many conservation management projects and research questions that could be advanced in a program of seabird research across the three island groups (David Priddell, pers. comm.).

- Other suggestions have been made to translocate land bird species to islands where the local species or subspecies has become extinct (as was in effect done with the Norfolk Island boobook owl). For example if a surplus of Tasman parakeets could be produced through management of nest sites, could some of these birds be used to re-establish a population on Lord Howe Island[1]? This would not only represent a potential gain for the Lord Howe ecosystem, but provide a valuable insurance population in case of future problems on Norfolk Island.

Invasive species constitute a key threat to the biodiversity values of Norfolk Island

- The arrival of invasive alien species such as rats, cats, ants and weeds where they have been previously absent has had profound impacts on islands around the world. The majority of all recorded extinctions have taken place on islands. Many of these extinctions are directly attributable to the impacts of invasive vertebrate predators and competitors, such as rats, cats and pigs.

- On Norfolk Island the impact of invasive species has been as dramatic as anywhere. Seabird colonies have declined significantly as a result of predation by rats and feral cats. This has seriously reduced the flow of marine nutrients to terrestrial ecosystems. The entire island ecosystem is considered at risk as a result of the reduction in phosphorous that was previously deposited in the guano of millions of seabirds.

- Black rats and Polynesian rats have been implicated in the decline of the Tasman parakeet, golden whistler, scarlet robin, burrow-nesting seabirds, reptiles and invertebrates. Rats have also been identified as a threat to four threatened plant species.

- Feral cats are implicated in the decline of the Norfolk boobook owl, Tasman parakeet, Golden whistler, scarlet robin, most nesting seabirds and the two reptiles.

[1] This and similar suggestions are made in the Action Plan for Australian Birds 2010

- Several introduced birds have increased appreciably in numbers in recent years, including the Crimson rosella which has been implicated as a competitor for nests with the Tasman parakeet, and the European starling and feral chickens. The invasive Argentine ant is also present at a number of sites around Norfolk Island. This species has had significant impacts on island biodiversity elsewhere. The Asian house gecko has also established at several sites around the island recently. If this species were to find its way to Phillip Island it could have serious implications for the rare lizards found there. The threats this species poses are not clear, although any risk assessment would be likely to favour eradication of this alien species as soon as possible, if this were possible. Several pathogens have also been reported on the island, including "beak and feather" disease which was probably responsible for the deaths of many Tasman parakeets in the 1970s.
- The unique and iconic Norfolk Island pine is classified as a threatened species (Vulnerable) by the IUCN. A root-rotting fungal disease that is a threat to Norfolk Island's pines and other native plants is exacerbated by low levels of soil phosphorous – again highlighting the inextricable link between seabirds and the island's ecosystem.
- Several seabirds have been eliminated from Norfolk Island including the Pycroft's petrel which was probably eliminated by early Polynesian settlers. The Providence petrel was famously extirpated in the 1790s by European settlers after HMS *Sirius* foundered off Slaughter Bay. The only burrow-nesting seabird still breeding on Norfolk Island in numbers is the wedge-tailed or Pacific shearwater. While there are no recent estimates of numbers it has been suggested that the population has declined in recent decades as a result of feral cat predation at breeding colonies. Cats also probably kill most of the smaller numbers of little shearwaters and black-winged petrels that attempt to nest here.
- Fortunately, capacity to effectively manage invasive species impacts is rapidly improving, and confidence to undertake island restoration projects is growing around the world.

A history of conservation achievements on Norfolk Island

- A number of important conservation successes have been achieved in the Island Group.
- Underpinning these achievements has been the creation of the Norfolk Island National Park, Botanic Garden and the Public Reserve network, and the preparation of management plans including biodiversity conservation goals and invasive species management objectives.
- The eradication of rabbits from Phillip Island in 1988 was a significant international achievement which has created important opportunities to restore the island, and to develop a small, but growing nature tourism enterprise.
- The initiation of recovery programs for the Tasman parakeet and Norfolk boobook owl in the mid-1980s were important steps. A program of intensive rat and cat control was initiated in the National Park aimed at reducing their impact on Tasman parakeets and other native birds. The preparation of a Norfolk Island threatened species recovery plan also constituted an important development. This plan identifies key threats to the islands' biodiversity, and sets out a number of objectives and actions to address them. Further support to achieve planned objectives would constitute a major step forwards.

- Considerable effort has gone into weed control in the National Park and Public Reserves, by government agencies and community groups. A program aimed at eradicating Argentine ants is currently underway across Norfolk Island, focused on reducing associated risks to human health and the economy, as well as to native biodiversity.

Islands of hope: solutions are available to protect Norfolk Island's natural heritage, but further action is urgently required

- The very features that make islands special and vulnerable also present unique conservation management opportunities. In particular, island ecosystems are often more intact than continental ones. Furthermore, their isolation from other landmasses means islands may be ideal sites to eradicate terrestrial invasive species, and to prevent their reinvasion. Our growing collective capacity to eradicate invasive alien species and to maintain effective biosecurity programs – coupled with emerging confidence in our ability to recover native species and to restore biological communities means we have entered a new, more positive era in biodiversity conservation. The number, scope and scale of eradication projects being undertaken around the world is increasing rapidly.
- The eradication of European rabbits from Phillip Island in the mid-1980s provides strong evidence of the impact of invasive species – in this case a browser which, together with feral goats and pigs earlier, removed virtually all the vegetation from the island, de-stabilised soils and destroyed seabird breeding burrows. Photo-points established at the time of the rabbit eradication, and re-measured subsequently, show dramatic vegetation recovery – of both native and introduced species. Fortunately Phillip Island remains free of invasive predators such as rats and cats. Birds and lizards are responding well as vegetation recovers. In addition to increases in existing populations, three species of petrels not recorded on Phillip Island prior to the rabbit eradication are now present and breeding. These and many other examples provide some indication of the potential to restore islands if invasive species are eradicated.
- Recognising what has already been achieved in the Group, and that further initiatives are urgently needed, coupled with advances in invasive species management, species recovery and island restoration which have been made recently, there is an exciting prospect that Norfolk Island could be developed as an international model for the conservation and restoration of inhabited islands. Such a model would be both important and timely.
- The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides for the establishment of Commonwealth reserves in areas of Commonwealth responsibility. The EPBC Act provides, *inter alia*, for the listing of threatened species, the making of recovery plans for listed species and protection for listed species in areas of Commonwealth responsibility.
- The Norfolk Island National Park and the Norfolk Island Botanic Garden are established under both the EPBC Act and specific Norfolk Island legislation. The current management plan for the park and garden prepared under the EPBC Act came into effect in 2008 for a period of 10 years and, *inter alia*, provides for any necessary threatened species recovery

actions to be undertaken, including reintroductions of species to and from the park and botanic garden.

- The Norfolk Island Region Threatened Species Recovery Plan (2010) is a comprehensive plan for the recovery of all 58 species listed under the EPBC Act. In the Norfolk Island National Park and Botanic Garden, the Director of National Parks will implement the recovery plan in accordance with the management plan for the park and garden. For areas outside the national park and botanic garden, the Commonwealth is required to seek the cooperation of the Norfolk Island Government with a view to jointly implement a recovery plan. There is no legal requirement under the EPBC Act for the Norfolk Island Government to implement a recovery plan in the Territory. A recovery plan similarly does not place obligations on any individual landholder on Norfolk Island.

Social and economic dimensions

Most island restoration programs to date have been undertaken on uninhabited islands where public interests and potential land use conflicts have been minimal. Increasingly, however, consideration is being given to managing invasive species and restoring ecosystems on larger, inhabited islands. There is growing awareness that incorporating social and economic dimensions, alongside ecological and logistical ones, will be important if conservation goals are to be achieved and desired outcomes sustained on inhabited islands, and other sites. There are few precedents for such multi-focused, integrated approaches. Restoration practitioners have much to learn about how these wider dimensions can be appropriately incorporated.

Based on the discussions we had during our visit we observed that local people value their natural heritage and would support further efforts to conserve Norfolk Island's biodiversity, provided the methods employed, and associated risks and costs, were acceptable. We sensed that many residents take pride in their natural environment, and have strong views on the conservation of particular species and sites. A number of community groups have demonstrated their interests in biodiversity conservation through their involvement in flora and fauna surveys, weed control programs, species recovery projects and other activities. It will be critical that local views and interests are appropriately reflected in any conservation program to be developed.

While local residents' needs are important, it should be noted that there is a wider "community of interest" that extends beyond Norfolk Island. National and international conservation organisations, as well as people with special interests, rate the Group highly. Many would welcome opportunities to contribute to a cooperative conservation program.

Norfolk Island is currently in an economic depression which is impacting on the quality of life of residents, and on the ability of the Norfolk Island government to support conservation activities. In a recent economic assessment it was suggested that economic development should focus largely on tourism since this industry was the main economic driver on the island. Nature tourism was identified in the report as an "emerging niche opportunity" for Norfolk Island.

A new tourism sub-market involving cruise ships was suggested, and the development of wharf facilities to handle containerised cargo and to unload passengers was identified as an important potential economic development project. Such developments which allow vessels to berth could present significant new biosecurity risks. If effective biosecurity measures were implemented as part

of the overall expansion of tourist facilities, however, such development could be an asset complementing tourism expansion.

Given Norfolk Island's globally significant natural heritage, and growing international awareness and interest in conserving island biodiversity, we suggest there is considerable potential to promote nature tourism here as an important economic development measure. We would expect developing nature tourism would be compatible with some other potential developments in the tourism, and perhaps, other sectors. The prospect of linking Norfolk Island's cultural heritage (a current focus for tourism) with its natural heritage deserves further consideration. Recent initiatives to provide opportunities for visitors to visit islands such as Lord Howe (Australia), the Galapagos (Ecuador) and the Chatham Islands (New Zealand), where they are able to contribute some time as conservation volunteers, in addition to more conventional tourist activities, could be considered for application on Norfolk Island. We would be surprised, for example, if a revenue generating conservation volunteer program could not be developed focused on weed control on Phillip Island and, perhaps, other biodiversity conservation activities. While such opportunities would need to be developed carefully, and expectations may need to be managed, we believe such a strategy presents exciting prospects to achieve ecological, social and economic goals.

A vision for the future

It is abundantly clear to us that many people have demonstrated vision for the conservation of Norfolk Island's biodiversity, and passion, initiative and commitment to achieve their objectives. An extensive list of achievements – including the continued survival of a number of species, can be credited to these people and the organisations which support them. It is also clear, however, that current efforts are not enough to prevent further degradation and biodiversity loss. Further more effective measures are urgently needed. We suggest a cooperative approach to achieving social and economic goals, as well as ecological ones is needed. We also suggest that Norfolk Island could be promoted as an international model of a conservation-based island economy.

Developing an agreed vision and strategy

An important first step in any development would involve the adoption of a vision for Norfolk Island which is shared by island residents and other key stakeholders. We suggest below that a workshop should be convened on Norfolk Island as soon as possible where such a vision could be considered.

We suggest the workshop could be built around the following key concepts:

- Building stronger partnerships
- Developing a plan of action
- Securing access to funding
- Promoting Norfolk Island globally

We identify below some questions which may be useful in identifying topics for discussion at the workshop.

Building new links with mainland Australia

- Given the limited conservation management capacity on Norfolk Island, could one or more regional NRM bodies[2] and NGOs in Australia (e.g. Landcare, Greening Australia) agree to work with, and share expertise and resources, with Norfolk Island organisations?
- Is there interest amongst stakeholders in participating with bodies such as the Australian Small Island Forum[3] and Island Rescue Alliance[4]. In the case of the IRA the opportunity exists for Norfolk Island to host a meeting of either the ASIF or Island Arks Symposium in 2014.

Developing and implementing a shared plan for the recovery of threatened species

- The biodiversity of Norfolk Island is covered by a number of current plans. There seems little reason to embark on another process of planning. However, could the implementation of these plans be better achieved by refining objectives and tasks and building greater community engagement and ownership in their implementation?
- Many of the lessons learned about engaging small communities and rural land-holders by Natural Resource Management agencies in Australia may be directly applicable to Norfolk Island. How might these lessons be taken forward to practical application?

Developing a sustainable source of funding for environmental projects

- On-going support for projects will require further financial resourcing. Even a small but steady stream of income from donations, environmental levies, visitor fees, merchandise sales etc. would be helpful and enable local groups to apply for more significant funding from Australian and international sources.

Promoting Norfolk Island globally as a model for island conservation

- The declining tourism sector has been extensively discussed. Is there an opportunity for Norfolk Island to develop a new and more vibrant tourism niche encompassing both cultural and natural heritage? Is there potential to apply conservation volunteer models successfully employed elsewhere, to Norfolk Island? How might a new emphasis on environmental volunteers and environmental entrepreneurship bring economic stimulus to Norfolk Island?
- How could the important achievements and challenges of Norfolk Islanders be better show-cased globally – and by doing so gain greater attention and potentially new sources of financing, resources and expertise?
- Could Norfolk Island stakeholders agree on a joint plan of action to achieve long-term and globally significant achievements in island restoration through an agreement with the Lord Howe Island Board and the Government of New Zealand (Kermadec Islands)?

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[2] e.g. Northern Rivers CMA which currently also includes Lord Howe Island, or the ACT NRM Council

[3] http://www.asiflordhoweisland.com/

[4] http://www.islandarks.com.au/islandarks/Symposium.html

- Should the Norfolk Island and Australian governments consider the benefits of Norfolk Island joining SPREP[5] as a member in its own right? SPREP members are independent Pacific nations, as well as metropolitan governments and their self-governing Pacific Island Territories. For example France, New Caledonia, French Polynesia, and Wallis and Futuna are all separate members of SPREP. Similar arrangements exist for New Zealand (Cook Islands, Niue) and the USA (American Samoa, Guam, Northern Marianas). In this regard the absence of Norfolk Island seems an anomaly. The benefits to Norfolk Island may include direct access to island-specific expertise on environmental management and a forum to raise issues and develop solutions to common island problems.

Suggested next steps

Despite the creditable achievements of the past, and some on-going programs within the National Park and some Public Reserves, little information is available about progress in addressing declines of forest birds and other native species. It appears that monitoring of rats and feral cats, and of Tasman parakeets and other species, is no longer rigorous enough to provide reliable information on the status of native species, or their threats. Greater effort is needed to gather such information, and to revitalise species recovery and pest management programs. While it was beyond the scope of this assessment to identify constraints to current conservation programs, we suggest the Commonwealth Government and the Norfolk Island Administration consider the following suggested actions.

- A statement of support, in principle, should be declared jointly by the Commonwealth Government and the Norfolk Island Administration to more effectively protect Norfolk Island's remaining biodiversity through the joint implementation of the Norfolk Island Threatened Species Recovery Plan.
- A statement of support, in principle, should be declared jointly by the Commonwealth Government and the Norfolk Island Administration to support economic stimulus and employment through targeted programs for "green" economic development.
- A workshop should be convened on Norfolk Island as soon as possible to discuss the need for a cooperative conservation program. The focus of this meeting should be to facilitate agreement amongst key stakeholders to a vision for Norfolk Island which incorporates ecological, social and economic needs. A process for engaging stakeholders in developing and implementing an integrated conservation strategy should also be determined.
- Potential (local, national and international) donors and other contributors should be identified who may wish to participate in a revitalised Norfolk Island conservation program. Their participation at the workshop should be facilitated.
- A governance structure and processes through which information will be gathered and disseminated, decisions made, resources allocated and tasks defined will need to be

[5] http://www.sprep.org/

determined. This may involve a group with executive powers, supported by one or more advisory groups.

- Island-wide surveys and censuses should be undertaken as soon as possible to gain a clearer picture of the current distribution and numbers of as many plants and animals as possible, including threatened native species and introduced species. The prospect of taking a 'Bioblitz' approach through which a 5-day visit to Norfolk Island by ecologists with relevant specialist interests and skills was coordinated to gain a "snapshot" of the status of a range of taxa could be investigated. Selected monitoring programs should be appropriately supported and maintained.
- Reviews of species recovery projects and the Phillip Island restoration program, and associated weed and pest control programs, should be commissioned, to identify any necessary improvements or requirements for additional support. New plans should be prepared, as appropriate, to inform strategic decisions and to guide management actions.
- A research plan should be prepared and priority research projects initiated to underpin conservation decision making.
- A communication plan may also be required to ensure local residents, management agencies, donors and other stakeholders have access to current information and are able to influence decisions and to contribute to prescribed actions.

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