NATIONAL RECOVERY PLAN for the ORANGE-BELLIED PARROT *(Neophema chrysogaster)*

The Orange-Bellied Parrot
Recovery Team

Acknowledgments

This document is based on the draft plan written by Mark Holdsworth and Jonathan Starks on behalf of the Orange-bellied Parrot Recovery Team (OBPRT). The OBPRT members at the time were Andrew Govanstone, Bob Green, Jocelyn Hockley, Mark Holdsworth, Julie Kirkwood, Richard Loyn, Jonathan Starks, Peter Menkhorst, Neil Murray and Andrew West.

Sally Bryant (DPIW) edited earlier drafts while Emma Lowe and Chris Schulz (Australian Government of the Environment and Water Resources) guided the final production of the recovery plan and background document.

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This recovery plan has been prepared under the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, *Flora and Fauna Guarantee Act 1988* (Vic), *Threatened Species Protection Act 1995* (Tas), *National Parks and Wildlife Act 1972* (SA) and *Threatened Species Conservation Act 1995* (NSW).

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Preface

The Orange-bellied Parrot Recovery Plan has been prepared under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to guide recovery activities within a planned and logical framework. This recovery plan has been subject to consideration and approval under respective threatened species legislation in the four range States; New South Wales, South Australia, Victoria and Tasmania.

The results of actions implemented from the previous Recovery Plans (Brown and Wilson 1984; Stephenson 1991; Orange-bellied Parrot Recovery Team 1999) and recommendations by Saunders (2002) lay the foundation for developing strategies in this Plan. The production of this Plan was delayed due to limitations on project officer time and procedural matters. Actions undertaken during the period 2003-2005 were conducted in accord with the previous plan (Orange-bellied Parrot Recovery Team 1999) and were mostly confined to achievable on-going actions. This Plan replaces earlier recovery plans for the species and the Victorian Action Statement (Edgar and Menkhorst 1993), which will be updated to reflect this Plan.

This Plan summarises a large body of information on the Orange-bellied Parrot to provide a concise approach to recovery implementation. Detailed information on previous recovery plans, species description, life history, biology, population status and threats are contained in the *Background Information on the Orange-bellied Parrot* provided additionally to this plan.

Species Information and General Requirements

Species details

Conservation status

The Orange-bellied Parrot, Neophema chrysogaster is protected by State and Commonwealth legislation throughout its range. The Orange-bellied Parrot is listed nationally as Critically Endangered under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act 1999). The Orange-bellied Parrot is listed as Threatened under the Victorian Flora and Fauna Guarantee Act 1988; as Endangered in Schedule 3 of the Threatened Species Protection Act 1995 in Tasmania; as Endangered in Schedule 7 of the National Parks and Wildlife Act 1972 in South Australia; and as Endangered in Schedule 1 of the Threatened Species Conservation Act 1995 in NSW.

The International Union for Conservation of Nature and Natural Resources lists the Orange-bellied Parrot as Critically Endangered (International Union for Conservation of Nature and Natural Resources 2002) as does the Action Plan for Australian Birds 2000 (Garnett and Crowley 2000) and the Advisory List of Threatened Vertebrate Fauna in Victoria (Department of Sustainability and Environment 2003).

Population estimates

During the late 1800s, and in the 1920s, the species was reported widely as being common, or locally abundant (Jarman 1965). No estimates of population size were made during this period; however, anecdotal observations suggest the population was many thousands (Hutchins and Lovell 1985). Concerns for the plight of the species was first voiced by Matthews (1917) and the abundance of the Orange-bellied Parrot has declined steadily since. Recent population estimates based on marked individuals at Melaleuca (southwest Tasmania) for the period 1994-2004 shows an average minimum population of 92 birds (range 71 –116). Surveys of other parts of the breeding range in recent years have not found other large congregations of breeding birds similar to Melaleuca. It is therefore unlikely the adult wild population exceeds 150 individuals (Mark Holdsworth pers. comm.).

Surveys of the winter population shows in recent years fewer birds are observed than the summer population at Melaleuca. The reasons for this difference probably indicates the species is using different habitat, is dispersing into smaller flocks, or is moving beyond traditional search areas during winter.

Distribution

The Orange-bellied Parrot is endemic to south-eastern Australia including Tasmania. Formerly, the species' range on the mainland extended from Adelaide, and possibly Yorke Peninsula, southeast through the Coorong, Robe, Beachport and Port MacDonnell in South Australia, east through southwestern coastal Victoria, Port Phillip Bay to South Gippsland, and north to near Sydney. In Tasmania the species extended along the west and south coasts, east to Bruny Island (North 1912; McGill 1960; Jarman 1965; Loyn and Kinhill Planners 1980; Brown and Wilson 1982, 1984; Higgins 1999).

The Orange-bellied Parrot is now rarely recorded in large numbers from west of the Murray River in South Australia or east of Jack Smith Lake in South Gippsland, Victoria (Higgins 1999). Recent records of single birds in New South Wales from Shoalhaven, in 1986 (Starks 1988), and at Shellharbour (G. Southwell pers. comm.) and Maroubra, in 2003 (B. Hensen pers. comm.) suggest a low, but unknown level of activity in that State. Figure 1 shows the present distribution of the Orange-bellied Parrot.

The species' current breeding range is a narrow coastal strip of southwest Tasmania between Birchs Inlet, in Macquarie Harbour, and Louisa Bay on the southern coast (see Figure 1). Most breeding activity occurs within 20 km of Melaleuca, in what is considered one breeding population (Brown and Wilson 1984).

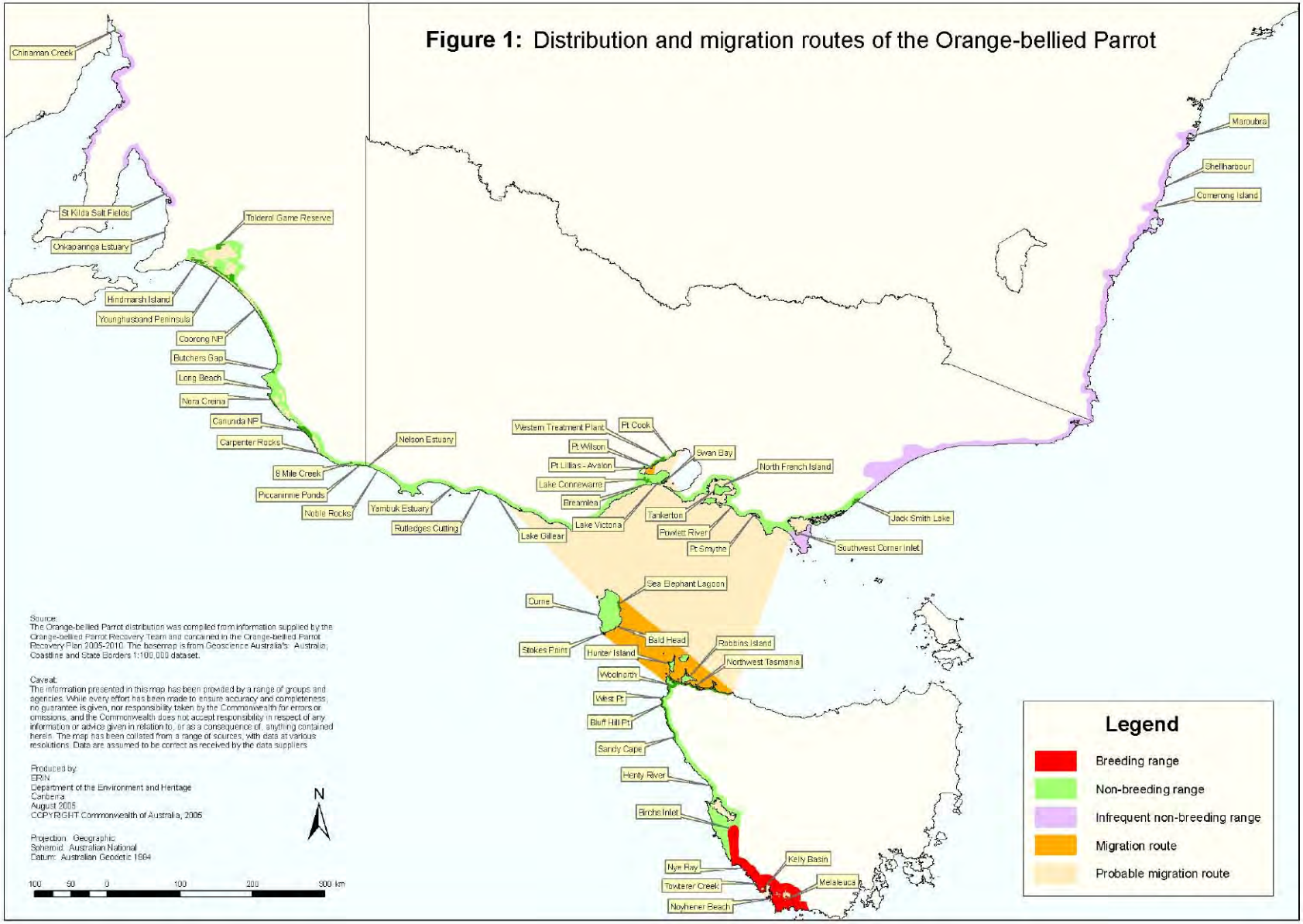
Figure 1: Distribution and migration routes of the Orange-bellied Parrot
Chinaman Creek
St Kilda Salt Fields
Onkaparinga Estuary
Tolderol Game Reserve
Hindmarsh Island
Younghusband Peninsula
Coorong NP
Butchers Gap
Long Beach
Nora Creina
Carunda NP
Carpenter Rocks
8 Mile Creek
Piccaninnie Ponds
Noble Rocks
Nelson Estuary
Yambuk Estuary
Rutledges Cutting
Lake Gillear
Western Treatment Plant
Pt Cook
Pt Wilson
Pt Lillias - Avalon
Lake Connewarre
Breamlea
Lake Victoria
Swan Bay
North French Island
Tankerton
Powlett River
Pt Smythe
Jack Smith Lake
Southwest Corner Inlet
Sea Elephant Lagoon
Curne
Stokes Point
Bald Head
Hunter Island
Robbins Island
Northwest Tasmania
Woolnorth
West Pt
Bluff Hill Pt
Sandy Cape
Henty River
Birches Inlet
Nye Bay
Towterer Creek
Kelly Basin
Melaleuca
Noyhener Beach
Maroubra
Shellharbour
Comerong Island
Source:
The Orange-bellied Parrot distribution was compiled from information supplied by the Orange-bellied Parrot Recovery Team and contained in the Orange-bellied Parrot Recovery Plan 2005-2010. The basemap is from Geoscience Australia's: Australia; Coastline and State Borders 1:100,000 dataset.
Caveat:
The information presented in this map has been provided by a range of groups and agencies. While every effort has been made to ensure accuracy and completeness, no guarantee is given, nor responsibility taken by the Commonwealth for errors or omissions, and the Commonwealth does not accept responsibility in respect of any information or advice given in relation to, or as a consequence of, anything contained herein. The map has been collated from a range of sources, with data at various resolutions. Data are assumed to be correct as received by the data suppliers
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Canberra
August 2005
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Projection: Geographic
Spheroid: Australian National
Datum: Australian Geodetic 1964
N
100 50 0 100 200 300 km
Legend
Breeding range
Non-breeding range
Infrequent non-breeding range
Migration route
Probable migration route

Habitat critical to the survival of the species
Eucalypt forest (in the breeding range) saltmarshes, coastal dunes, pastures, shrublands, estuaries, islands, beaches and moorlands, usually within ten kilometres of the coast, make up the diverse habitats used by Orange-bellied Parrots.

Breeding habitat is a mosaic of eucalypt forest, rainforest, and extensive fire dependant moorland and sedgeland plains, intersected by wooded creeks, rivers and estuaries within the Tasmanian Wilderness World Heritage Area (Brown and Wilson 1982, 1984; Stephenson 1991). Nesting occurs predominantly in the hollows of live Smithton Peppermint *Eucalyptus nitida* in patches of forest throughout coastal southwest Tasmania, but focussed within 20 km of Melaleuca and 5km of Birchs Inlet (Brown and Wilson 1984; Higgins 1999). The entire known breeding population is contained within the Tasmanian Wilderness World Heritage Area (in particular the Southwest National Park) and Southwest Conservation Area.

On passage in western and northwestern Tasmania (including offshore islands) the species occurs in dunes, heathland, coastal grasslands, saltmarsh and pasture. On King Island, they mostly occur in saltmarsh dominated by Beaded Glasswort *Sarcocornia quinqueflora*, flanked by tall dense Swamp Paperbark *Melaleuca ericifolia* forest (Higgins 1999).

In Victoria, the species mainly uses saltmarshes dominated by Beaded Glasswort, Southern Seaheath *Frankenia pauciflora* and Shrubby Glasswort *Sclerostegia arbuscula*, as well as associated grassy and/or weedy pastures. Key sites are along the western shore of Port Phillip Bay, particularly The Spit Nature Conservation Reserve, and on the Bellarine Peninsula at Lake Connewarre Wildlife Reserve and Swan Bay, including Swan Island. In South Australia, beaches, dune frontages and adjacent dune systems and sheltered areas along rocky foreshores are favoured. Little is known of the species' habitat preferences in NSW.

Food availability in saltmarshes in mid-winter was thought to be a key factor affecting population dispersion (Loyn *et al.* 1986). The study of Lee (2000) confirmed there are significant fluctuations in availability of seed during the non-breeding period, and *Frankenia pauciflora* was found to be the most important indigenous saltmarsh species carrying seed during mid-winter before the onset of seeding in *Sclerostegia.* At The Spit Nature Conservation Reserve, Orange-bellied Parrots were strongly associated with saltmarsh communities dominated by *F. pauciflora* and *Suaeda australis.* Lee (2000) and Lee and Burgman (undated) also concluded that the distribution of important saltmarsh food plant species depends more critically on edaphic and microtopographic features associated with inundation and exposure than on the details of soil nutrient status.

Mapping of habitat critical to the survival of the species
Since research into the ecology of the Orange-bellied Parrot began in 1979, winter habitat and their plant communities has been mapped and described in detail in Victoria (Carr and Kinhill Planners 1979; Yugovic 1984; McMahon *et al*. 1994) and in South Australia (Gibbons 1984; Casperson 1995). A new method of remote sensing to identify saltmarsh communities suitable for Orange-bellied Parrot was developed by the Royal Melbourne Institute of Technology (Race 1994a, 1994b). In Tasmania, a comprehensive map of all vegetation communities is available (TASVEG). All Orange-bellied Parrot habitats, including grasslands, heathlands, scrub, wetlands and saltmarshes as well as woodlands and forest are mapped to 1:25000 scale.

Important population

Currently, only one wild breeding population is known; however, there is some evidence of partitioning at the extremes of the breeding range. Released captive-bred birds have not been observed at Melaleuca, and Melaleuca wild birds have not been observed at Birchs Inlet during the breeding season. This is despite individuals from both sites being observed together in wintering habitat. The species forms a single but widely distributed population within the wintering range. Population monitoring throughout the range has been an important component of the recovery program.

Additional Information

International obligations

Protection and conservation of the Orange-bellied Parrot is consistent with the Convention on Biological Diversity as defined under the National Strategy for the Conservation of Australia's Biological Diversity.

The Orange-bellied Parrot is listed in Appendix I under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) as a species threatened with extinction for which international trade in specimens is permitted only in exceptional circumstances. The species is also listed under the Agreement between the Government of Australia and the Government of Japan for the Protection of Migratory Birds and Birds in Danger of Extinction (Japan-Australia Migratory Bird Agreement or JAMBA). The majority of the breeding population occurs within the Tasmanian Wilderness World Heritage Area, which is declared under the World Heritage Convention. The Orange-bellied Parrot is also a Listed Marine Species under the EPBC Act.

The Orange-bellied Parrot occurs within several Wetlands of International Importance (Ramsar) including:

- The Coorong and Lakes Alexandrina and Albert (South Australia)
- Port Phillip Bay (Western Shoreline) and Bellarine Peninsula; Western Port; Corner Inlet and Gippsland Lakes (Victoria)
- Lavinia State Reserve (Tasmania)

Sustainable management of Orange-bellied Parrot resources within these sites is fundamental to the long-term survival of the species. The legislative basis for meeting Australia's responsibilities under these international conventions is the EPBC Act.

Affected interests

Commonwealth Government
The species is known to occur on Commonwealth land under the control of the Department of Defence at two sites in Victoria: Swan Island and Point Wilson. Potentially, suitable habitat exists on other Department of Defence land, such as HMAS Cerberus, Victoria. During August 2003, an Orange-bellied Parrot was recorded many times at the Anzac Rifle Range, Maroubra (NSW). Management of these sites is the responsibility of the Commonwealth. In addition, the Orange-bellied Parrot migrates over Commonwealth waters and some interactions with fishing industries may occur. The species also occurs in the Commonwealth Marine Area as defined under the EPBC Act.

Conservation and land management agencies
The Orange-bellied Parrot is a listed threatened species in four states and therefore State conservation and land management agencies are also directly responsible for its protection and management.

Tourism
Visitor development in the Tasmanian Wilderness World Heritage Area is regulated under the World Heritage Area Management Plan, however, visitor activity and numbers in the Melaleuca visitor service area (the centre of Orange-bellied Parrot breeding range) requires careful control and management. The increasing tourism opportunities within the Macquarie Harbour region will require careful regulation to ensure activities do not impact on the species at Birchs Inlet. Access to habitat critical to the survival of the species is tightly controlled in Victoria. The Recovery Plan recognises the importance of community interest, expectations and involvement in the recovery process, and the demand by a small component of the tourism market to see Orange-bellied Parrots. Implementation of actions of the Recovery Plan will not adversely effect tourism and in some circumstances mutual benefits can be gained through careful management

Mining and other natural resource extraction
Significant areas within Tasmania are subject to existing or potential mineral exploration or mining operation on unallocated Crown Lands and within Conservation Areas (ie. Hunter Island, Arthur Pieman and Southwest). Australian Titanium Minerals Ltd. is required to protect Orange-bellied Parrot habitat with a mining exclusion zone at its sand mine lease on King Island. Recent exploration activity by Tasgold Pty Ltd within the Southwest Conservation Area in the Elliott Bay/Low Rocky Point region (Tasmania) has been assessed for potential impact on the species. The area is within the potential breeding range of the Orange-bellied Parrot, but searches thus far have not detected the presence of the species. In the event a mining operation is proven this would be subject to a comprehensive Development Proposal and Environmental Management Plan under State legislation. The tin mine at Melaleuca, operated by Rallinga Mines Pty. Ltd., does not appear to have any adverse impact on the species under the current low intensity operation.

A shell-grit mining lease at the northeastern end of Lake Victoria, southeast of Geelong, would have reduced the area of available habitat in past decades. However, the mined area will not be enlarged and Orange-bellied Parrots have been recorded feeding on Sarcocornia colonising a spoil heap close to the working mine. Protection of saltmarsh communities on the Bellarine Peninsula will not limit the current shell-grit operation. A basalt quarry adjacent to the upper saltmarsh at The Spit Nature Conservation Reserve is subject to consideration under the *EPBC Act 1999*. There is also the potential for future sand mining operations in South Australia to impact on winter habitat.

Throughout the migratory and non-breeding range, coastal areas are subject to kelp and seagrass extraction. Some of these operations have been subject to careful consideration and implementation of management prescription to avoid impact on the Orange-bellied Parrot (ie. kelp harvest within the Arthur-Pieman Conservation Area). However, other operations pre-exist interest in the Orange-bellied Parrot or require consideration to minimise or avoid disturbance and habitat destruction (eg. kelp harvesting on King Island).

Natural Resource Management organisations
This Recovery Plan will involve at least 11 Natural Resource Management regions/organisations throughout the species' range. These organisations will have varying degrees of responsibility to secure funding and implement actions under this Plan through State/Commonwealth partnership agreements.

Indigenous people

The Orange-bellied Parrot occurs on two Indigenous Protected Areas (IPA) – Preminghana (Tas) and Deen Maar (Vic). Parts of this Recovery Plan will require assistance and input from a range of indigenous people who either have management responsibility for affected lands or have a cultural connection to lands critical for the conservation of the Orange-bellied Parrot. Table 1 lists indigenous organisations consulted during the preparation of the Plan and/or assisted with implementaion.

Table 1. Indigenous people representative organisations consulted in the development of this Plan.

Group name	Affected area/s	Responsibility/interest
Tasmanian Aboriginal Land Council	Preminghana IPA (Tas) Tasmanian Wilderness WHA (Tas)	- observation, land management - fire management
Ngarrindjeri people	Coorong (SA)	- observation, land management, cultural heritage, ecotourism
Framlingham Aboriginal Trust	Deen Maar IPA (Vic)	- observation, land management, cultural heritage, ecotourism
Wathaurong Aboriginal Cooperative Ltd.	Port Phillip Bay and Bellarine Peninsula (Vic)	- observation, land management, cultural heritage
Wurundjeri Tribal Land Compensation and Cultural Heritage Council Inc.	Western Port (Vic)	- observation, land management, cultural heritage
NSW Aboriginal Land Council	Southern coast (NSW)	- observation, land management, cultural heritage
Kaurna people and SA DEH Aboriginal Partnership Program	South Australia	- observation, land management, cultural heritage

Implementation of relevant actions within this Plan will be undertaken with the approval and cooperation of organisations listed above and/or any other Aboriginal group or individual identified during the implementation period. All activities will be undertaken with respect to the cultural traditions of Aboriginal Nations throughout the species' range.

Benefits to other species

Protection and improved management of saltmarsh and beach/dune vegetation will result from implementing actions within this Plan. The exclusion of stock grazing from these vegetation communities will make a significant contribution to protecting the biodiversity values of these fragile areas. Research into the phenology, hydrology and microtopographical requirements of saltmarsh has greatly increased our understanding of saltmarsh ecology. Major input into management plans for coastal areas within the range of the Orange-bellied Parrot has resulted in greater protection of many wetland, saltmarsh and beach/dune habitats. Migration studies and surveys through the wintering range have improved our understanding of the distribution and ecology of the Blue-winged Parrot *Neophema chrysostoma* and Elegant Parrot *N. elegans*. Many of the recovery actions may also benefit a range of resident breeding and migratory shorebirds, many of which are listed under the EPBC Act. Implementation of this Recovery Plan is unlikely to have any negative impacts on other native species or ecological communities.

Social and economic impacts

There are clearly some implications for industry, planning systems and governments at all levels. The Recovery Team is committed to working with industry stakeholders and planners to deliver multiple outcomes.

Public information and education
Community education, awareness and the support of volunteers are important components of this Recovery Plan and essential to the long-term recovery of the species. The Orange-bellied Parrot has a high public profile and its survival is a prominent issue for industrial and urban developments at key non-breeding sites. Significant social and economic issues are associated with the conservation of the Orange-bellied Parrot throughout its range. Public access and development of habitat adjacent to populated coastal settlements are important issues.

Public awareness of the status of the Orange-bellied Parrot, and the efforts to save the species is high. The continuing high level of enthusiastic participation in winter counts and the summer observer programs are evidence of public support for the recovery effort. Members of the OBPRT have publicised the recovery effort by writing articles, giving talks to local and national organisations, attending conferences, and encouraging television, radio and print media coverage. The recovery effort is promoted through an Orange-bellied Parrot web page, which is accessed through the Birds Australia website (http://www.birdsaustralia.com.au/birds/obp.html).

Education officers of the State conservation agencies publicise the plight of the species in a range of ways using note sheets, broadsheets, endangered species packages for schools, and the internet (such as http://www.dpiw.tas.gov.au). Interpretive signs have been provided for visitors at Carpenter Rocks, the Melaleuca observatory and at a few key wintering sites around Swan Bay, Victoria. In 1998, the interpretive material at Melaleuca was updated, and now incorporates a video-surveillance system, allowing visitors to view nest box activity. Posters and note cards, published privately, continue to be very popular. Two issues of the Orange-bellied Parrot Recovery Program newsletter *Trumped-up Corella* have been produced. It has been circulated to over 300 supporters and is also available via the Orange-bellied Parrot web page.

Primary and secondary schools have been involved through having Orange-bellied Parrot ecology as components of their school natural history curricula and through sponsorship of the nest box program. Numerous tertiary undergraduate and post-graduate studies have been undertaken investigating Orange-bellied Parrots and their habitat.

A list of published reports, scientific articles and post-graduate studies produced since the Orange-bellied Parrot recovery program started is provided in the Bibliography of the *Background Information for the Orange-bellied Parrot* (http://www.deh.gov.au/biodiversity/threatened/recovery/list-common.html).

Economic benefits
The opportunity for visitors to land at the airstrip at Melaleuca to view Orange-bellied Parrots from an observatory is an asset to flight operators and tour guides. Likewise, the commencement of high quality cruise ship tours including guided interpretation of the release program at Birchs Inlet is an added value to tourism ventures in the Tasmanian Wilderness World Heritage Area. Many small businesses will realise an economic benefit through the provision of services and supply of equipment during the implementation of recovery actions. Some companies have benefited, or are likely to benefit, from promotion of products and services connected with the implementation of the recovery program.

A potential risk has been identified through the possible attraction of migrating parrots to the lights used on squid boats. This risk will be investigated further under this Recovery Plan in cooperation with Australian Fisheries Management Authority.

Orange-bellied Parrots are known to occur on freehold and Crown land used for stock grazing. Grazing, trampling and disturbance associated with this activity can have significant impact on Orange-bellied Parrots at some sites. Exclusion of cattle or changes to stocking practices to maintain or improve Orange-bellied Parrot habitats may affect some local interests.

Many of the areas subject to wind energy development proposals in Tasmania, southern Victoria and south-eastern South Australia coincide with the migratory and winter range of the Orange-bellied Parrot. Implementation of the actions of the Recovery Plan could affect the preparation and implementation of environmental impact assessments and habitat management plans by wind energy proponents. Cooperation between wind energy proponents, wildlife agencies and the Orange-bellied Parrot Recovery Team is important to ensure best possible outcomes for species.

Known and Potential Threats

Biology and ecology relevant to threatening processes
The Orange-bellied Parrot survives as a small, single population. The majority of the population breeds around Melaleuca in southwest Tasmania, though recent efforts may have succeeded in reestablishing a second breeding group at Birchs Inlet. The entire population migrates along the west coast of Tasmania and crosses western Bass Strait to coastal Victoria. Stochastic factors such as disease, loss of genetic variation, storms during migration, and destruction of nest sites, eggs and chicks by wildfire have the potential to reduce the species' long term survival.

Degradation and loss of habitat
Orange-bellied Parrot habitat has been degraded and lost throughout the species' range, however, the majority of this impact has occurred within the non-breeding range (ie. migratory corridors and wintering areas). The major contributing factors are:

- drainage of wetlands for grazing
- alteration and destruction of saltmarsh for industrial and urban development
- grazing of native vegetation
- vegetation clearance for agricultural purposes
- changes to land use practices
- inappropriate fire regimes
- weed invasion
- recreational activities

Incompatible land use practices continue unabated in some areas and species recovery is limited by the capacity to ameliorate these impacts. For example, grazing still occurs on some coastal grasslands and saltmarsh habitats in Tasmania and Victoria. Negative impacts include physical damage to saltmarsh plants and creation of tracks through the vegetation, improving access to pests including rabbits, hares and foxes, and grazing stock which consume seeding heads otherwise available to Orange-bellied Parrots. Positive impacts occur in situations where salt-tolerant introduced grasses are invading a saltmarsh. Grazing by sheep in some circumstances may help to slow the rate of spread of these weeds where grazing pressure prevents seeding from taking place.

Invasive weeds
Invasive weeds impact on Orange-bellied Parrot foraging habitats throughout the species' non-breeding range. Species of concern include:

- Tall Wheat Grass *Lophopyron ponticum*
- Rice Grass *Spartina anglica*
- Coast Barb-grass *Parapholis incurva*
- Sea Barley-grass *Critesion marinum*
- Marram Grass *Ammophila arenaria*
- Sea Spurge *Euphorbia paralias*
- Boxthorn *Lycium ferocissimum*

These aggressive colonisers are salt-tolerant and have the capacity to swamp native food plants within saltmarshes, coastal herbfields and coastal dune systems. Most are subject to varying degrees of control in each State; however, a more strategic approach is required to ensure key Orange-bellied Parrot sites are effectively targeted.

The Orange-bellied Parrot is known to forage on a range of exotic weed species within the non-breeding range, several of which are potentially toxic (e.g. Common Heliotrope *Heliotropium europaeum* and Opium Poppy *Papaver somniferum*). Lethal or sub-lethal impacts from consumption of these species and the added risk of exposure to any herbicides used to control weeds, has not been assessed.

Introduced predators and competitors
Although there is a lack of clear evidence of predation on Orange-bellied Parrots by European Fox *Vulpes vulpes* and Feral Cat *Felis catus*, anecdotal observations suggest there is the potential at some localities. Intuitively, the presence and high abundance of these introduced predators at Orange-bellied Parrot sites must increase the level of mortality and thus limit recovery potential. The introduced European Rabbit *Oryctolagus cuniculus* grazes on saltmarsh and beach-dune vegetation and on weed species, though the impact this has on food availability for Orange-bellied Parrots has not been assessed. In the breeding grounds, Common Starlings *Sturnus vulgaris*, Honey Bee *Apis mellifera* and Sugar Glider *Petaurus breviceps*) aggressively compete with Orange-bellied Parrots for nest hollows and kill incubating females at nest (Holdsworth pers comm.). However, the extent of this impact is not yet quantified. In each State, the ongoing control of feral predators and competitors in Orange-bellied Parrot habitat are significant tasks being undertaken at some level by volunteers, local councils, the Department of Defence, Melbourne Water, and State conservation agencies.

The impact of introduced food competitors in the non-breeding range, such as European Goldfinch *Carduelis carduelis*, European Greenfinch *C. chloris* and House Mouse *Mus musculus*, has not been quantified. Control of these species has been proposed to improve the quality and quantity of critical winter habitat (Orange-bellied Parrot Recovery Team 1999) but requires further investigation.

Wind energy developments
The presences of wind farms, and increasing level of development proposals throughout most of the Orange-bellied Parrot migratory and winter range, has the potential to impact on the species. The species' migration (during the night and day) through a narrow coastal band on which wind farms have been established or are planned, presents the potential for collision. The entire Orange-bellied Parrot population could pass through most of the wind farm sites in western Tasmania whilst on migration. On the mainland, those Orange-bellied Parrots that winter west of Cape Otway or in South Gippsland could pass through wind farm sites in those areas. Wind farms sited in and adjacent to important wintering sites (e.g. Yambuk Lake) pose a risk to Orange-bellied Parrots commuting between foraging sites, roosting and drinking sites. In addition, direct habitat loss or effective habitat loss (through abandonment of sites due to the presence of turbines) may add to the impact on the species at key sites. Generally, wind farm developers within the Orange-bellied Parrot range have been required to undertake pre-development bird utilisation studies to determine potential impacts. Where possible turbine layout is adjusted to avoid key migratory or feeding zones to reduce collision risk. At some sites a range of mitigating measures have been implemented to further reduce collision potential. This has included on site weed control, habitat restoration and provision of supplementary food crops away from windfarm sites. The collective impact of wind farms on birds (including the OBP) is uncertain. A study commissioned by the Australian Government Department of the Environment and Water Resources, to provide information on the cumulative risk of bird strike from windfarms (including the cumulative risk to OBPs) was finalised in February 2006. The purpose of the study is to better inform the environmental regulatory process.

Disease
A significant cause of death among captive Orange-bellied Parrots during the breeding program up to 1991 was Psittacine Circoviral Disease (PCD) (Brown 1988). The disease was detected in wild birds in 1993, however, while a significant number of individuals are antibody positive to PCD, there has not been any detected outbreak of the disease. Sub-clinical effects are unknown. Since 1991, mortality due to PCD has been practically eliminated in captive-bred stock through the relocation of the Hobart facility to a warmer, more sheltered site. Management of this disease will be consistent with the Threat Abatement Plan (Australian Government Department of the Environment and Heritage, 2005) and associated hygiene protocols (Australian Government Department of the Environment and Heritage 2006) which have been made under the provisions of the *EPBC Act 1999*.

Other causes of mortality in captive birds include renal failure, intestinal worm impaction and aspergillosis (Philips and Holdsworth 2006) all of which are controllable to some degree. However, during the 2005/06 breeding season an unusually high rate of nestling mortality of 43 individuals at three times the average rate occurred at the Taroona breeding facility. Post mortems could not determine the cause of death, but subsequent tests of material from these nestlings indicated the presence of a herpes virus.

Further tests have failed to detect herpes virus in adult birds in the Taroona or Healesville populations and investigations are continuing to determine if a novel virus is active in the captive and wild populations. The results of these investigations will be used to develop a comprehensive disease action plan. This event has indicated there may be a need to improve the standard of aviaries, quarantine facilities and management of the captive population. Irrespective of the cause or causes of death, this event has highlighted the potential risk to the captive population as insurance against extinction in the wild. In addition, any embargo on releases may reduce the wild population and limit the establishment of sub-populations. These will therefore reduce the species long-term viability. A contingency plan is required to make provision for the establishment of a new isolated captive colony, using 'clean' founder stock from the wild to deal with a virulent diseases found to be active in the captive population, but absent from the wild population.

The illegal import of exotic psittacine birds presents a risk of introducing and establishing new virulent diseases to Australian wild and captive populations. This risk is of particular significance to threatened species such as the OBP. The control of transfer of disease from introduced species, has been identified as a high priority by DEH for preventative action, and has been addressed through the establishment of draft quarantine protocols for the housing of seized exotic psittacine birds.

Illuminated boats and structures
Anecdotal evidence suggests the bright lights used by squid boats operating in Bass Strait and the Southern Ocean occasionally attracts migrating birds, including parrots. This could potentially seriously disrupt Orange-bellied Parrots migrating to the mainland and may be influencing survival. Other lit structures such as lighthouses and ships could also pose a similar threat to migrating Orange-bellied Parrots. These potential risks require further investigation.

Trapping
Currently there are no Orange-bellied Parrots in captivity outside the captive-breeding program. Significant powers under State and Commonwealth legislation, combined with the difficultly in trading or selling a species not represented in aviculture collections has probably eliminated trapping of this species. However, the potential for illegal trapping still exists and State and Commonwealth authorities need to remain vigilant.

Inadequate knowledge of population trends
Estimating the total size of the Orange-bellied Parrot population is extremely difficult. The species breeds over a wide region within the Tasmanian Wilderness World Heritage Area and the Southwest Conservation Area, and locating all nest sites is problematic. Population trends and breeding success is focused on what is believed to be the core breeding population at Melaleuca. During non-breeding periods the species is widely distributed across four States and recent observations indicate a wider range of habitats are being favoured. This dispersal makes direct counts impossible. Increased effort to identify colour-banded individuals within non-breeding habitat will improve the knowledge of survivorship and highlight potential causes of mortality. Refined and effective population studies are important tools for measuring the success (or otherwise) of conservation actions. Population studies should be designed with statistical input to measure overall population trends and breeding success rather than total size.

Areas under threat
Most of the breeding habitat of the Orange-bellied Parrot is protected within the Tasmanian Wilderness World Heritage Area. However, an unknown proportion of the breeding population may be subject to development pressure within the Southwest Conservation Area, as a result of recreational activities and mineral exploration, within the Cape Sorell to Low Rocky Point region. A variety of habitats and migratory corridors throughout the non-breeding range are under land use and development pressures. Identification and implementation of ecologically sustainable principles at these sites is fundamental to the conservation of the species.

Population under threat
Providing quarantine and disease management can be improved, the captive population is considered to be secure; however, the entire wild population remains under threat.

Vision, Objectives, Performance Criteria and Recovery Actions

Vision of the Orange-bellied Parrot Recovery Team

"Our vision is to be able to see large flocks of Orange-bellied Parrots throughout its natural range and to ensure human impacts no longer place the species under threat of extinction."

Overall objective

The overall objective of the recovery effort is to minimise or eliminate human induced threats in such a manner the species no longer meets the *EPBC Act 1999* criteria for the Critically Endangered category and can be moved to a lower threat category. This will be achieved through:

- a sustainable improvement in the quality and quantity of Orange-bellied Parrot habitat at key sites throughout the range to increase the carrying capacity;
- ensuring the wild and captive populations of the Orange-bellied Parrot continue to survive beyond the life of this Plan; and
- ensuring existing and new threats are managed with appropriate measures to ameliorate their impact.

Specific objectives and criteria

The specific objectives contained within this Plan are:

1. To monitor the population size, productivity, survival and life history of the Orange-bellied Parrot.
2. To identify all sites used by Orange-bellied Parrots and better understand migration.
3. To increase the carrying capacity of habitat by actively managing sites throughout the species' range.
4. To identify, measure and ameliorate threats, particularly in migratory and winter habitats.
5. To increase the number of breeding sub-populations /groups.
6. To maintain a viable captive population.

The criteria for meeting these objectives are:

- O The wild breeding population is increased from approximately 150 to more than 250 individuals.
- O The average life expectancy of individuals in the wild population is increased.
- O All key sites used by the Orange-bellied Parrot are identified, protected and managed for the species.
- O Key threats through the species' range are removed or adequately controlled.
- O At least one other viable sub-population in the breeding range is established.
- O Public support for the conservation of the Orange-bellied Parrot is increased.
- O The captive population contains at least 150 individuals and maintains genetic diversity equivalent to the wild population.

Each objective has a range of Recovery Actions, if implemented, will contribute to achieving these objectives and progress toward attaining our vision.

Recovery Actions

The Recovery Actions presented here are listed against the specific objectives (above). Each generic action is followed by a number of specific tasks and measurable performance criteria. Organisations and/or individuals with responsibilities for implementation and evaluation are identified. A full list of abbreviations used in this Plan is given in Appendix 1. Where appropriate, actions include an adaptive experimental management approach (AEMA) as recommended in the Major Project Review (Saunders 2002) to test competing hypotheses, which underpin management approaches. This will ensure research and management activity will result in effective and measurable outcomes. In addition, scientific sub-committees will be formed to guide research actions to ensure a high level of rigour is applied to project design and analytical testing. A primary performance criteria for all research actions under this plan is the publication of results in peer reviewed journals. Funding and implementation of most actions will be directed through Natural Resource Management (NRM) regions established under the *Framework for the Extension of the Natural Heritage Trust (2002)*. Communication and involvement of NRM regional committees in the implementation of actions will be a fundamental focus of this recovery plan. In order to assist in this process, each of the NRM regions within the species' range are identified against each action as a resource for regional groups to consider for inclusion in their respective strategic plans.

Action	Description		Tasks and Performance Criteria	Priority
Specific objective 1 - To monitor the population size, productivity, survival and life history of the Orange-bellied Parrot				
1.1	1.1.1	A recognised ornithological statistician will review population data and, where necessary, redesign the monitoring program to maximise statistical robustness whilst minimising program expenditure.	Banded birds will be observed throughout the breeding season (Oct.–Mar.) annually and will be used as a basis to estimate the annual breeding population, survival and longevity of the species. This data will also be used to develop demographic models to aid in the understanding of the species' population trends and guide conservation management actions. A review of the methodology and statistical robustness of this action is required to determine whether data is collected and analysed in the most cost-effective manner. The provision of supplementary seed at Melaleuca will be reviewed annually by the OBPRT and, if deemed appropriate, phased out over the life of this Plan. **Responsibilities** Implementation: DPIW (1.1.1 and 1.1.3), SCs and volunteers (1.1.5), SCs and BSPO (1.1.2, 1.1.4 and 1.1.6 -1.1.9) Evaluation: RPC and OBPRT NRM Regions: Cradle Coast and Southern (Tas)	High
	1.1.2	Undertake demographic modelling using data collected from observations within the breeding range. Where appropriate a recognised ornithological statistician will be employed to undertake this task.		
	1.1.3	In consultation with the OBPRT produce and implement a breeding season monitoring program annually.		
	1.1.4	Select, train and provision pairs of volunteers to undertake observation activities on fortnightly shifts (Oct.–Apr.).		
	1.1.5	Undertake observations of birds at Melaleuca, Birchs Inlet and other areas as required.		
	1.1.6	Collate and analyse breeding survey data annually.		
	1.1.7	Report results to the OBPRT annually, and where appropriate, publish results.		
	1.1.8	Provide induction for all volunteers.		

Recovery actions continued

Action	Description	Tasks and Performance Criteria	Priority
1.2	1.2.1 Tree climber/s and bird bander will access nest sites and band birds. 1.2.2 Select and train 4-6 people to undertake monitoring tasks each year. This includes ABBBS authority requirements, data collection, bird handling and occupational health and safety requirements detailed in Action 3.3. 1.2.3 Undertake inspections as required of all known nests throughout the breeding range. 1.2.4 Collate and analyse breeding productivity data annually. 1.2.5 Report results to the OBPRT annually, and where appropriate, publish results in appropriate journals. 1.2.6 Implement research, monitoring and /or management actions as required under an adopted Psittacine Circoviral Disease Threat Abatement Plan.	Undertake monitoring of breeding productivity annually. This will assist with population estimates and species' survival estimates. The monitoring program consists of several visits to nests occupied by Orange-bellied Parrots throughout the breeding period. This will involve: - monitor nest box usage by parrots and other species, - search for natural nests, - determine clutch size, hatching success and fledging success of all nests, - record physical attributes of all nest sites, - attach ABBBS approved colour leg-bands to all nestlings within nest boxes and from natural sites when accessible, - identify parentage (by observing presence of colour banded adults) at all nest sites, - collect blood samples from all banded nestlings for DNA and, when required, PCD analysis, - collect other samples (ie parasites, feather samples, crop samples) as required to support other research projects. **Responsibilities** Implementation: DPIW (1.2.1), BSPO (1.2.2–1.2.3 and 1.2.5–1.2.7), monitoring team (1.2.4) Evaluation: RPC and OBPRT NRM Regions: Cradle Coast and Southern (Tas)	High

Recovery actions continued

1.3	1.3.1 Facilitate the formation and operation of a regional group network. 1.3.2 Develop protocols for regional group operation and provide regular communication through the newsletter (see action 7.3). 1.3.3 Develop and activate a habitat classification system. 1.3.4 Develop pocket guide, website information and media material to enhance identification of Neophemas. 1.3.5 Conduct winter population surveys and searches of new areas as identified by the OBPRT annually. 1.3.6 Perform a power analysis on count data in first year to determine effectiveness of survey effort and modify methodology as required. 1.3.7 Collate, enter and analyse winter count and banding data annually. 1.3.8 Report results of winter population surveys to the OBPRT annually, and where appropriate, publish results in appropriate reports or journals. 1.3.9 Communicate results of winter surveys through TUC and other relevant media. 1.3.10 Conduct training sessions for volunteers and regional groups annually. This will be conducted in conjunction with the Threatened Bird Network and other volunteer organisations in each State. Delivery of this action will include field orientation days, distribution of educational material, accreditation of Orange-bellied Parrot identification skills and volunteer feedback. 1.3.11 Attend all winter range regional group meetings.	Surveys of the winter population to be undertaken annually in late July and the main wintering habitats will be monitored in May and September. Greater emphasis will be placed on collecting sightings of banded and unbanded birds to improve the robustness of mark-recapture population modelling in the winter range. More frequent observations of colour-banded birds in the winter range will also assist in understanding survival, migration behaviour, foraging requirements and population dynamics. This action will rely heavily on the establishment and activities of regional groups. **Responsibilities** Implementation: DSE (1.3.1), WSPO (1.3.2–1.3.12) Evaluation: RPC and OBPRT NRM Regions: All relevant SA, Vic and NSW, Cradle Coast (Tas)	High
1.4	1.4.1 Climatic and breeding data will be undertaken annually.	In the first year, investigate the relationship between climatic variation, migration and breeding success across years. **Responsibilities** Implementation: BSPO, DPIW Evaluation: OBPRT NRM Regions: N/A	High

Recovery actions continued

Action	Description	Tasks and Performance Criteria	Priority
Specific objective 2 - To identify all sites used by Orange-bellied Parrots and better understand migration			
2.1	2.1.1 Produce 1:25,000 (or better) vegetation maps for entire Orange bellied Parrot range by the end of the first year. 2.1.2 Develop and distribute a site register of Orange-bellied Parrot locations by the end of the second year. 2.1.3 Conduct site audits to determine status and change. 2.1.4 Update the site register in each year of the Plan. 2.1.5 Analyse GIS data to determine influences on population dynamics. 2.1.6 Provide conservation agencies with habitat information to guide land management practices. 2.1.7 Publish results of GIS data analysis and implementation of results.	GIS site register of all historic and current Orange-bellied Parrot habitats is developed, populated and maintained. The GIS data will be analysed to determine if causes of population decline or spatial change can be attributed to particular management regimes or threats. **Responsibilities** Implementation: DSE (2.1.1), WSPO, BSPO and conservation agencies of each State (2.1.2–2.1.8). Evaluation: OBPRT NRM Regions: All relevant Vic, SA, NSW and Tas.	High
2.2	2.2.1 Conduct winter surveys and habitat searches as identified by the OBPRT annually. 2.2.2 Based on survey results, provide information to land managers on habitat use and conservation. 2.2.3 Report results of winter surveys to the OBPRT annually.	Surveys will be undertaken annually for Orange-bellied Parrots within non-breeding habitat to understand the daily and seasonal use of habitats, identify known and potential food plants, proximity of potential roost sites, identify threats and stimulate management of Orange-bellied Parrot resources on private and public lands. **Responsibilities** Implementation: DSE (2.3.1), WSPO (2.3.2–2.3.4) Evaluation: RPC and OBPRT NRM Regions: All relevant Vic, SA and NSW, Cradle Coast (Tas)	High
2.3	2.3.1 Provide appropriate training of all personnel. This will include wilderness first aid, radio operations and helicopter safety. 2.3.2 Undertake a major survey of all potential breeding habitats in Year 1 and Year 2. 2.3.3 Undertake targeted surveys at key sites in Year 1, 2 Year 2 and Year 3. 2.3.4 Collate and analyse survey results annually. 2.3.5 Report results of survey to the OBPRT annually.	Surveys of the breeding population in the first and last year of the Plan will be undertaken to measure any changes (contraction or expansion) in the breeding range of the species. **Responsibilities** Implementation: DPIW (2.4.1), BSPO (2.4.2, 2.4.5 and 2.4.6), BSPO and survey teams (2.4.3 and 2.4.4) Evaluation: RPC and OBPRT NRM Regions: Cradle Coast and Southern (Tas)	High

Recovery actions continued

Action	Description	Tasks and Performance Criteria	Priority
2.4	2.4.1 Undertake a review of the available technologies to assist with measuring Orange-bellied Parrot movements in the first year. 2.4.2 Based on 2004 field trials, refine and automate the AAMS by the end of the first year. 2.4.3 Report the results of the field trials and development to the OBPRT by the end of the first year. 2.4.4 Develop and fund a deployment schedule for targeted AAMS by the end of the first year. 2.4.5 Deploy automated acoustic monitoring systems (AAMS) and report results annually to the OBPRT.	Search methods and innovative techniques to identify key sites and measure migration behaviour will be developed in the first year. Details of flight heights, flight corridors, air speed and non-stop *versus* staged movements are identified to better inform decision-makers particularly in relation to wind energy developments. Search methods will be developed to measure variables during surveys within the non-breeding range (see actions 1.3 and 2.2). Research and development of an (AAMS) will be undertaken under this action. **Responsibilities** Implementation: DPIW Evaluation: RPC and OBPRT NRM Regions: All relevant Vic, SA, NSW and Tas	
Specific Objective 3 - To increase the carrying capacity of habitat by actively managing sites throughout the species' range			
3.1	3.2.1 Review and report on the effectiveness of conservation measures in all existing management plans and identify linkages with other conservation programs throughout the range by the end of the second year. 3.2.2 Ensure Orange-bellied Parrot requirements are integrated into all new management plans throughout the range. 3.2.3 Monitor management plan development and make submissions as required.	The implementation and effectiveness of land management plans containing measures to protect Orange-bellied Parrot resources throughout the species' range will be reviewed over the life of the plan. These include statutory reserve plans, NRM catchment management plans and local government development plans. The review will also identify linkages with other NRM conservation programs that benefit the Orange-bellied Parrot and, where possible, provide advice on how these programs can be strengthened. Agencies responsible for developing and implementing these plans will be informed of the locations of known and potential Orange-bellied Parrot habitats through the site register (Action 2.1) and informed of review outcomes. **Responsibilities** Implementation: WSPO and State agencies Evaluation: OBPRT NRM Regions: All relevant Vic, SA, NSW and Tas	Medium

Recovery actions continued			
Action	**Description**	**Tasks and Performance Criteria**	**Priority**
3.2	3.2.1 Undertake annual patch burning around known and potential Orange-bellied Parrot breeding sites in accordance with regional fire management plans. 3.2.2 Develop experimental design and methodology for a higher degree research program to investigate fire ecology in the first year. 3.2.3 Monitor feeding dispersal across vegetation age classes at Melaleuca, and the plant species being utilised in each year of the Plan. The data will be made available to above study. 3.2.4 Undertake fire ecology study of buttongrass moorlands (including Orange-bellied Parrot values) by the end of the first year.	Foraging habitat at breeding sites is maintained through appropriate fire management over the life of the plan. Habitat management burns will be conducted between April and September (when Orange-bellied Parrots are absent) every year within the breeding range, in accordance with the Parks and Wildlife Service regional fire management plans and in consultation with Department of Primary Industries and Water, Nature Conservation Branch staff. A detailed study of the usage of vegetation age classes by Orange-bellied Parrot is required. This study will be undertaken as a component of a higher degree research to investigate fire ecology of buttongrass moorlands in the World Heritage Area. **Responsibilities** Implementation: PWS (3.2.1), BSPO and RPC (3.2.2), BSPO (3.2.3), postgraduate student (3.2.4) Evaluation: OBPRT and RPC NRM Regions: Cradle Coast and Southern (Tas)	High
3.3	3.3.1 Professional tree climber is required to access nest sites. 3.3.2 Train other DPIW staff and/or volunteers in the skills necessary to continue the provision of nest boxes annually. This will include wilderness first aid, radio operations, helicopter safety and tree climbing techniques. 3.3.3 Continue to provide, maintain and monitor up to 150 nest boxes at Melaleuca, Birchs Inlet, Noyhener and Towterer Creek for the life of the Plan. 3.3.4 Undertake control measures for introduced competitors as required	Over the life of the plan provide, maintain and monitor nest boxes to allow ease of colour banding, monitoring of productivity and to monitor/control competitors. Common Starlings, Honeybees and Sugar Gliders can aggressively compete with Orange-bellied Parrots for nests. Common Starling and Honeybee populations will be controlled where this occurs. The level of impact from Sugar Gliders will be determined. The provision of nest boxes will be reviewed annually by the OBPRT and, if deemed appropriate, phased out over the life of this Plan. **Responsibilities** Implementation: DPIW (3.3.1 and 3.3.5), BSPO (3.3.2–3.3.3), nest box maintenance team (3.3.4) Evaluation: RPC NRM Regions: Cradle Coast and Southern (Tas)	High

Recovery actions continued

Action	Description	Tasks and Performance Criteria	Priority
3.4	3.4.1 Exclude stock from key habitats within the APCA, Hunter Island, Perkins Island and West Kangaroo Island in the first year. 3.4.2 Identify other sites where grazing should be excluded or modified. 3.4.3 During the first year undertake a study of grazing practices and impacts on conservation values on coastal lands throughout Tasmania (including King Island). 3.4.4 Implement recommendations from 3.4.2 and 3.4.3 and integrate within grazing management guidelines and leases. 3.4.5 Monitor vegetation and Orange-bellied Parrot usage in response to changed stock management on an on-going basis. 3.4.6 Publish results of changed land management practices.	Over the life of the plan ensure migratory habitat in Tasmania is managed, including significant areas of heathland, coastal scrub and saltmarsh along the west and northwest of Tasmania which is used for the grazing of livestock. Assist with management options where empirical observations confirm the Orange-bellied Parrot is at risk during years with low productive years in sensitive habitats and from limited seed availability. Foraging sites within the Arthur-Pieman Conservation Area (APCA), Hunter Island, West Kangaroo Island and Perkins Island have been identified for protection from grazing pressure attention. Other sites within the region, including freehold tenures on King Island, will be further investigated. A comprehensive review of grazing practices on coastal lands will be conducted to guide management of Crown Lands. **Responsibilities** Implementation: PWS (3.4.1 and 3.4.3), DPIW (3.4.2, 3.4.4 and 3.4.6) Evaluation: PWS and RPC NRM Regions: Cradle Coast (Tas)	High

Recovery actions continued

Action	Description	Tasks and Performance Criteria	Priority
3.5	3.5.1 Investigate and report on nutritional suitability of food crops by in the second year of the plan. 3.5.2 Undertake a trial planting of food crops adjacent to key wintering sites during the first three years. 3.5.3 Undertake experimental saltmarsh revegetation on at least one site within the core wintering range in each year of the Plan. 3.5.4 Document and report annually on the results of winter habitat management/ creation, and publish the results. 3.5.5 Monitor the health of natural and experimental saltmarsh sites using fixed photo-points and habitat description transects throughout the life of this Plan. Incorporate photographic records into the site register database (see action 2.1). 3.5.6 Develop, fund and implement a winter habitat revegetation plan by the end of the third year. The plan will aim to establish a chain of managed sites between key sites, no further than 50km apart. This will include the publication and distribution of a "how to guide" for the establishing saltmarsh and other Orange-bellied Parrot habitats. 3.5.7 Identify and assist private landholders undertake Orange-bellied Parrot conservation activities on their land.	Over the life of the plan additional foraging and roosting habitat at sites throughout the non-breeding range will be provided using innovative techniques. This includes providing additional habitat through a range of trials to establish what attracts or retains Orange-bellied Parrots, then to implement successful components at targeted key sites. The results of habitat creation experiments will be conducted using AEMA and incorporated into existing and new management plans under Action 3.1. Where Orange-bellied Parrot sites exist on private land, landowners will be consulted with the aim of producing and implementing management agreements. Landowners will be encouraged and, where necessary, assisted in applying for funds to undertake Orange-bellied Parrot conservation on their land. The nutritional suitability of different food crops and planting strategies will be tested. Experimental food crops will be planted and maintained adjacent to the Spit Nature Conservation Reserve (on Melbourne Water land), Lake Connewarre State Game Reserve (on private land), Yambuk Lake (on private land) and Piccaninnie Ponds Conservation Park (on private land). The saltmarsh revegetation plan for the Werribee River mouth (Murphy 2001) will be implemented. The methodology and results of this revegetation plan will be applied to other sites, particularly in western Port Phillip Bay and the Bellarine Peninsula. Negotiations will be instigated to ensure saltmarsh revegetation will be undertaken during the decommissioning of parts of the Western Treatment Plant. **Responsibilities** Implementation: SA DEH and DSE (3.5.1), Extension Officer (3.5.2–3.5.6) Evaluation: OBPRT and RPC NRM Regions: All winter regions	High
3.6	3.3.1 Develop a protocol for a release program of captive-bred birds on the mainland over the first two years. 3.3.2 Select at least two managed wintering sites and undertake a release of captive-bred birds by over the first two years. 3.3.3 Analyse and incorporate results into other actions as required, and report results.	The suitability of unoccupied winter habitat and revegetation programs will be tested through the release of captive-bred birds over the first two years of the plan. The experience gained from releases in Tasmania and at Point Wilson will be used to develop a release protocol for experimental releases on the mainland. **Responsibilities** Implementation: DSE Evaluation: OBPRT NRM Regions: All relevant Vic	Medium

Recovery actions continued

Action	Description	Tasks and Performance Criteria	Priority
3.7	3.7.1 Over the first three years of the plan conduct a study into the effect of grazing on the floristics of saltmarsh vegetation, and report results. 3.7.2 Implement results of trial if grazing proves to be effective.	A trial of the impact of grazing by sheep on the upper saltmarsh, Spit Nature Conservation Reserve will be conducted over the first three years. Funding for this study is provided from the Orange-bellied Parrot Trust Fund established by Hydro Tasmania to contribute to conservation of the species to offset potential impacts of the Woolnorth wind farm (northwest Tas). **Responsibilities** Implementation: DSE Evaluation: OBPRT, Arthur Rylah Institute for Environmental Research NRM Region: Port Phillip and Western Port	High
Specific Objective 4 - To identify, measure and ameliorate threats, particularly in migratory and winter habitats			
4.1	4.1.1 During the first year assess trend in golfer numbers versus trend in Orange-bellied Parrot numbers at Swan Island. 4.1.2 Continue with permit system for access to SNCR and Swan Island. 4.1.3 In conjunction with the new access policy to the Western Treatment Plant, examine potential for visitor/volunteer tours to WTP by the end of the first year.	Human activity will be monitored at the Western Treatment Plant (WTP), The Spit Nature Conservation Reserve and Swan Island over the first year. Prescriptions to minimise disturbance of Orange-bellied Parrots and protect fragile habitats will be developed, and advice will be provided to land management authorities in relation to development proposals. Consideration will be given to establishing a system of volunteer guides to accompany birdwatchers to observe Orange-bellied Parrots. This will provide an opportunity to educate visitors about the recovery effort, identification of Neophemas and, potentially, recruit observers to assist with winter surveys. **Responsibilities** Implementation: WSPO (4.1.1, 4.1.3), DSE, Parks Victoria and Melbourne Water (4.1.2) Evaluation: OBPRT NRM Region: Port Phillip and Western Port	High
4.2	4.2.1 Produce and distribute a detailed map of Orange-bellied Parrot distribution in relation to collision risk structures in the first year. 4.2.2 Develop mechanisms to ensure all collision risk structures proponents and associates are aware of Orange-bellied Parrot conservation issues by the end of the first year. 4.2.3 Develop environmental assessment and management guidelines for assessment of the impact and degree of significance of collision risk structure proposals on Orange-bellied Parrots and their habitat. 4.2.4 Identify areas of importance to Orange-bellied Parrots for siting collision risk structures developments 4.2.5 Develop dead bird search methodology for Orange-bellied Parrot and communicate with regulatory authorities and industry.	Continue to provide advice to proponents on the issues relating to collision risk and Orange-bellied Parrot conservation values at collision risk structures such as proposed wind farm sites throughout the range, particularly migratory corridors and winter habitats. Develop guidelines to aid risk assessment, wind farm site selection and micro siting of turbines. **Responsibilities** Implementation: Windfarm Working Group (4.2.1, 4.2.3–4.2.5), State planning agencies (4.2.2), OBPRT (4.2.5) Evaluation: OBPRT NRM Regions: All	High

Recovery actions continued

Action	Description	Tasks and Performance Criteria	Priority
4.3	4.3.1 Determine whether migrating parrots (and other migratory species) are attracted to squid boats in the first year. 4.3.2 If squid boats are found to pose a potential threat, develop mitigation measures to reduce this threat by the third year. 4.3.3 Identify all lit structures within Orange-bellied Parrot migratory corridors and develop a long term monitoring program to determine impact potential by the end of the first year.	In consultation with squid boat operators and Australian Fisheries Management Authority (AFMA) assess the impact of the squid fishery on the Orange-bellied Parrot and other migratory species within the western Bass Strait migration corridor and develop mitigation measures as required. Identify all other lit structures within the migratory corridor and assess the potential impact on Orange-bellied Parrot. Responsibilities Implementation: AFMA, RPC Evaluation: AFMA, OBPRT NRM Regions: N/A	Medium
4.4	4.4.1 Review cat and fox control programs in each State and NRM region within the Orange-bellied Parrot's range to determine target areas and where possible redirect efforts to key Orange-bellied Parrot sites. 4.4.2 Undertake a study of the impact of nest site competitors (ie common Starling, Honeybee and Sugar Glider). Where impacts of these threats are determined, undertake targeted control programs to increase reproductive success. 4.4.3 Where targeted control programs are established, ensure a rigorous AEMA is applied. 4.4.4 Based on the results of AEMA continually adjust and refine predator control programs throughout the range. 4.4.5 Develop research projects in conjunction with control programs to quantify the predation level on Orange-bellied Parrots and the effectiveness of control measures in reducing. 4.4.6 Encourage the application of strategic, community based cat control programs on King Island.	Over the life of the plan undertake research and, where required, implement control programs for introduced predators and competitors at key Orange-bellied Parrot sites using AEMA. The effectiveness of control measures, such as poison programs, trapping, shooting, fence exclusions and pet control will be measured and the results applied for greatest benefit. Experimental design will focus on the abundance of analogue prey species populations and the relative composition of these species in prey remains and scats. Such studies could be undertaken as a project through a tertiary institution (see Action 9.2). The success of this action will rely heavily forming partnerships with NRM regional groups to manage and implement targeted control programs. Restructure the cat control program on King Island with a more rigorous experimental design to measure the effectiveness of control measures. King Island has the potential to apply broader cat control measures to deal not only with the feral cat population but also the domestic source through strategic community based cat control programs. **Responsibilities** Implementation: PWS, PV and SA DEH Evaluation: PWS, DSE and SA DEH NRM Regions: All relevant Vic, SA, NSW and Tas	Medium

Recovery actions continued

Action	Description	Tasks and Performance Criteria	Priority
4.5	4.5.1 Examine introduced finch and Orange-bellied Parrot foraging behaviour and through targeted observations. Compare food resources used and report. 4.5.2 Where significant competition is detected, implement control programs at key sites.	Studies to determine the level of competition from introduced finches on Orange-bellied Parrot food resources within the non-breeding range will be undertaken during the second year. This action is suitable as a post-graduate project. (see Action 9.2). **Responsibilities** Implementation: RPC Evaluation: OBPRT NRM Regions: N/A	Low
4.6	4.6.1 During the first three years use the site register database to identify priority weed infestations. 4.6.2 Over the life of the plan develop site based control programs and engage land managers and volunteer groups in control programs. 4.6.3 In years, 3, 4 and 5 monitor the effectiveness of weed control efforts and the impact on saltmarsh resources.	Over the life of the plan control the spread of introduced invasive plants at key Orange-bellied Parrot sites. This includes: • Rice Grass *Spartina anglica* (Anderson's Inlet (Vic), Barwon River estuary (Vic) and Robbins Passage (Tas) • Boxthorn *Lycium ferocissimum* (The Spit NCR (Vic)) • Marram Grass *Ammophila arena*ria (Tasmanian Wilderness World Heritage Area) • Sea Spurge *Euphorbia paralias* (west coast and Bass Strait islands (Tasmania)) Prescriptions for the control of other species (e.g. Coast Barb-grass *Parapholis incurva*, Sea Barley-grass *Critesion marinum*) and at other sites will be developed. This will include the management of cattle grazing, fire and human activities that exacerbate the spread of invasive weeds. In many cases these control programs will be initiated by NRM regional groups under weed control programs. Better targeting of these programs is a key strategy for successful implementation of this action. **Responsibilities** Implementation: State agencies Evaluation: State agencies NRM Region: All relevant Vic, SA, NSW and Tas	High
4.7	4.7.1 Review the assumptions of the Drechsler PVA model and consider conducting a PVA using RAMAS Metapop. model. 4.7.2 Provide current data on population dynamics for inclusion in the refined PVA model.	A Population Viability Analysis (PVA) to assess the impacts of threats to the species will be completed. **Responsibilities** Implementation: State Agencies through external funding Evaluation: OBPRT NRM Regions: N/A	High

Recovery actions cont

Action	Description	Tasks and Performance Criteria	Priority
4.8	4.8.1 Monitor the number of flights and visitors to Melaleuca and report annually. 4.8.2 Develop a monitoring program to ensure negative impacts on Orange-bellied Parrots are measured and action taken to ameliorate those impacts. 4.8.3 Instigate measures to enable greater management control over the number/type of aircraft and visitors to Melaleuca on an on-going basis. 4.8.4 Develop and promote a code of conduct for visitors and commercial companies operating at Melaleuca on an on-going basis.	Consider the effect of aircraft and other visitor activity at Melaleuca and develop prescriptions. To be monitored over the life of the plan to ensure human activity does not impact on Orange-bellied Parrot values. Responsibilities Implementation: PWS Evaluation: DPIW, OBPRT NRM Region: Southern (Tas)	High
Specific Objective 5 – To increase the number of breeding sub-populations /groups			
5.1	5.1.1 In consultation with the OBPRT review the effectiveness of the release program each year and as required undertake release and monitoring programs annually. 5.1.2 Select, train and provision at least 2 volunteers per fortnight shift to undertake release activities from October to April. 5.1.3 Undertake and monitor releases of captive-bred Orange-bellied Parrots at Birchs Inlet for each year of the Plan. 5.1.4 Report results to the OBPRT annually. 5.1.5 Ensure on-going management activities to maintain adequate breeding, foraging and roosting habitats. 5.1.6 Monitor the impact of introduced nest competitors and implement control measures to reduce these impacts.	Over the life of the plan, implement, monitor and review the reintroduction of the Orange-bellied Parrot at Birchs Inlet. As required, captive-bred birds will be made available for release at Birchs Inlet. This action relies heavily on the involvement of volunteers to assist with husbandry of birds and monitoring studies. The success of this action is also reliant on the continued management of the breeding habitat, in particular, fire management, Common Starling and Honeybee control. Further work is required to determine the influence of Sugar Gliders on the reproductive success on the Orange-bellied Parrot at this and other sites. **Responsibilities** Implementation: DPIW (5.1.1), BSPO (5.1.2–5.1.3, 5.1.6–5.1.8), PWS (5.1.4), SC and volunteers (5.1.5) Evaluation: RPC, OBPRT NRM Region: Cradle Coast (Tas)	High
5.2	5.2.1 Undertake an assessment of other sites in southwest Tasmania for release of captive-bred birds by the end of the first year. 5.2.2 Based on results of 5.2.1, and if deemed appropriate, undertake alternative reintroduction program.	Assess the potential and efficacy of reintroduction of the Orange-bellied Parrot at other areas within the breeding range including Nye Bay, Noyhener Beach, Towterer Beach and Southport Lagoon. The assessment will consider nest site availability and competitors, foraging habitat quality and cost effectiveness of reintroduction. **Responsibilities** Implementation: DPIW (5.2.1), BSPO (5.2.2–5.2.3) Evaluation: RPC NRM Regions: Cradle Coast and Southern (Tas)	Medium

Recovery actions cont

Action	Description		Tasks and Performance Criteria	
Specific Objective 6 – To maintain a viable captive population				
6.1	6.1.1	Manage, report and review operation of the captive-breeding program.	The construction of new aviaries and quarantine facilities will be undertaken in the first year. Successful management of the captive population will include at least 150 individuals at all existing facilities over the next 5 years. This action will ensure sufficient birds are produced to supply the requirements of the reintroduction program and winter habitat experimental management whilst maintaining a captive population. Successful implementation of this action is reliant on the cooperation and assistance of partner institutions. The Captive Management Group (CMG) will oversee the implementation of husbandry and captive management processes. A significant component of the captive-breeding program is conducted by volunteers who undertake daily care of captive birds. **Responsibilities** Implementation: DPIW, HS and AZ (6.1.1-6.1.2, 6.1.7), CMC (6.1.3– 6.1.6) Evaluation: CMG NRM Regions: N/A	High
	6.1.2	Develop a Captive Management Strategy by the end of the second year.		
	6.1.3	Develop an Orange-bellied Parrot Husbandry Manual by the end of the first year.		
	6.1.4	Develop a Disease Action Plan by the end of the first year.		
	6.1.5	Develop contingency plans for emergency evacuation and new captive population to manage disease risks by the end of the second year.		
	6.1.6	Implement research, monitoring and /or management actions as required under an adopted PCD Threat Abatement Plan. Maintain captive breeding facilities at Taroona, Healesville Sanctuary and Adelaide Zoo for the life of this Plan.		
	6.1.7	Maintain a captive population of at least 150 individuals.		
	6.1.8	Produce at least 30 individuals for release into the wild each year.		
	6.1.9	Produce sufficient individuals for release as part of winter habitat experimental management.		
	6.1.10	Increase the reproductive success to at least 2 fledglings per female.		
	6.1.11	Provide resources to feed birds, operate and maintain aviaries, supply nest boxes, maintain security and provide veterinary care. This will include major capital works upgrade the facilities at Healesville Sanctuary and Taroona.		

6.2	6.2.1 Over the life of the plan develop a method for monitoring the heterozygosity of the wild population. 6.2.2 Obtain approvals to acquire new founder individuals from the wild as required. 6.2.3 Undertake DNA-based sexing annually and report to the CMG and OBPRT.	Over the life of the plan monitor and manage the genetic diversity of the captive population to ensure it is representative of the wild population. If a decline in the heterozygosity of the wild population is detected, the potential exists for selective release of captive birds to redress this imbalance. Founder stock may need to be collected occasionally in order to maintain genetic diversity within the captive population. It is also important, particularly for managing the captive-stock and the release program, to determine actual sex of individuals at an early stage. This will be done using DNA-based sexing techniques. Research under this action could be done through a stipend for a post-graduate study (see Action 9.2). **Responsibilities** Implementation: Commercial genetics laboratory (6.2.1, 6.2.3), DPIW, DSE, SA (6.2.2) Evaluation: CMG NRM Regions: N/A	High

Supporting Actions

The successful implementation of the Recovery Actions will require a range of Supporting Actions as described below.

Action	Description	Tasks and Performance Criteria	Priority
Supporting Action 7 – Foster community support and involvement in the conservation and recovery of the species and its habitat			
7.1	7.1.1 Commission market research into the needs of stakeholders in the first year. This will include surveys of landowners throughout the Orange-bellied Parrots range to determine awareness barriers. 7.1.2 Develop an action plan for community and stakeholder involvement based on the results of 7.1.1. 7.1.3 Secure funding and implement recommendation within the stakeholder strategy. 7.1.4 Produce a multi-media interpretive package in the first year. 7.1.5 Maintain and regularly update the Orange-bellied Parrot website 7.1.6 Develop a portable interpretive display for Orange-bellied Parrot promotion and publicity. 7.1.7 Develop and implement a program of site visits and activities for key stakeholders and media annually.	Develop and maintain communication pathways to meet the needs of stakeholders and the broader community. This will be achieved through a variety of means and may vary according to the needs of particular community groups or stakeholders. An analysis of the needs of stakeholders will be conducted. A multi-media CD-ROM and website based interpretive package will be produced to more effectively disseminate information to all stakeholders and the general community. This will include biological information, conservation significance, recovery actions and identification tools. Where a specific need is identified hard copy information may also be produced. In order to stimulate interest in the Orange-bellied Parrot and advocacy of the recovery effort, it is important opportunities be made available for all stakeholders and the general public to see the Orange-bellied Parrot and the recovery effort. This may include observation of birds throughout the range during organised field days, assistance with banding program or release of captive-bred birds. The formation of partnerships with other conservation programs through NRM regional groups will be an important tool for successful implementation of this action. **Responsibilities** Implementation: RPC Evaluation: RPC NRM Regions: All relevant Vic, SA, NSW and Tas	High

Supporting actions continued

Action	Description	Tasks and Performance Criteria	Priority
7.2	7.2.1 Support the activities of the South Australian and, Western Victoria Working Groups and new groups as they are formed. 7.2.2 Establish regional groups by the end of the first year at: a) Western Port (Vic) b) Bellarine Peninsula (Vic) c) Coorong (SA) d) King Island (Tas) e) North-western Tasmania f) South coast (NSW) 7.2.3 Identify gaps and target key individuals for the formation of new regional groups. Each regional group will conduct field days and volunteer training sessions at least once per year.	Support existing and establish new Orange-bellied Parrot regional groups throughout the range with particular emphasis on non-breeding regions. Natural Resource Management groups throughout the species' range will play an important role in facilitating, supporting and, in some cases, resourcing these regional groups. A core task of regional groups is to hold field days to provide information to local landowners and managers as well as provide a forum for training volunteers in observation techniques. **Responsibilities** Implementation: RPC (7.2.1), DSE and WSPO (7.2.2 a-b), SA DEH and WSPO (7.2.2 c), DPIW and BSPO (7.2.2 d–e), NSW NPWS and WSPO (7.2.2 f) Evaluation: RPC and OBPRT NRM Regions: All relevant Vic, SA, NSW and Tas	High
7.3	7.3.1 Secure the services of a suitably qualified volunteer editor of TUC in the first year. 7.3.2 Appoint sub-editors from regional and captive management groups to provide regular articles for inclusion in TUC by the end of the first year. 7.3.3 Produce two hard copy editions of TUC each year. 7.3.4 Publish a PDF version of TUC on the Orange-bellied Parrot website and associated web links.	Produce a recovery program newsletter Trumped-up Corella (TUC) and circulate more frequently than was achieved under the previous plan. A volunteer editor, appointed on an annual basis, will coordinate production of TUC on the Orange-bellied Parrot website, circulate via e-mail and hard copies as required. Resources for design, publication and circulation will be secured from sponsorship sources and all regional groups will be requested to provide articles through sub-editors in those groups. Responsibilities Implementation: WSPO (7.3.1–7.3.2), TUC editor (7.3.2–7.3.4) Evaluation: OBPRT NRM Regions: N/A	High

Supporting actions continued

Action	Description	Tasks and Performance Criteria	Priority
7.4	7.4.1 Develop and distribute a volunteer activities program annually. 7.4.2 Liaise (on an ongoing basis) with volunteer organisations and project managers on the coordination and support of the volunteer activities program. 7.4.3 Provide a safe work environment and a rewarding experience for all volunteers. 7.4.4 Monitor and report on volunteer activities and effort.	Coordinate volunteer involvement in the recovery program through the provision of advice and support. An activities program will be produced to encourage and manage volunteers. This will be used to communicate volunteer opportunities through volunteer organisation networks. Project officers and regional groups will play a key role in coordinating these efforts and raising community awareness. The success of volunteer involvement is dependent on providing a safe working environment and rewarding experience. Volunteer selection, training, supervision, provisioning and feedback are all-important aspects of volunteer coordination and require attention under this action. **Responsibilities** Implementation: TBN (7.4.1–7.4.2), all project managers (7.4.3–7.4.4) Evaluation: OBPRT NRM Regions: N/A	High
Supporting Action 8 – Develop and implement a Recovery Fund Plan			
8.1	8.1.1 Members of the OBPRT form a sub-group to oversee the development of a Recovery Fund Plan (RFP) in the first year 8.1.2 Advertise for expressions of interest for donor and/or corporate support within all major Australian newspapers and other forums in the first year. 8.1.3 Produce an RFP, including a marketing plan to identify potential sponsorship opportunities, and marketable sponsorship 'packages' aimed at attracting a range of sponsorship levels and regional sponsorship opportunities. Tax deductibility for gifts, bequests and sponsorships will be clearly set out within the RFP. 8.1.4 Implement the RFP over the life of this Plan and review by the third year.	Develop and implement a Recovery Fund Plan (RFP) with the aim to secure funds on a partnership basis from governments, private donors and corporate sponsors. A key component of the RFP will be identification of sponsorship marketing opportunities. The RFP will identify all tasks within this Plan not capable of being funded through government sources. These will be incorporated into sponsorship marketing packages, tailored to appeal to a range of sponsorship levels. The sponsorship component of the RFP will identify corporate neighbours who could contribute to recovery program tasks. This is particularly relevant to a number of industries in the Port Phillip Bay region. The RFP will also identify Ecological Trusts and other funding bodies for support of finite projects within this Plan. A fundraising person will assist the OBPRT to develop the RFP within the first year of this Plan. This may involve the costs of employing a professional fundraising adviser or the provision of corporation staff to develop the RFP. **Responsibilities** Implementation: OBPRT (8.1.1 and 8.1.4), DPIW (8.1.2), consultant (8.1.3) Evaluation: RPC, OBPRT NRM Regions: N/A	High

Supporting actions continued

Action	Description	Tasks and Performance Criteria	Priority
8.2	8.2.1 Develop a list of priority research, which can be done by tertiary students 8.2.2 Develop and distribute a tertiary institution partnership research program by the end of the second year. 8.2.3 Liaise (on an ongoing basis) with university research managers about the implementation of the research program and assist with funding applications.	Based on the actions within this Plan develop and distribute a program to foster collaborative research activities at tertiary institutions. Successful implementation of this Plan will rely on the continued involvement and establishment of partnerships with these and other institutions. **Responsibilities** Implementation: RPC Evaluation: OBPRT and RPC NRM Regions: N/A	High
Supporting Action 9 – Manage, review and report on the recovery process			
9.1	9.1.1 The OBPRT physically meets at least once per year (circa May) on a rotational basis in each of the range states. 9.1.2 The OBPRT holds extraordinary meetings to address conservation, program management and funding issues as is necessary. 9.1.3 Minutes of all such meetings are produced in a timely manner. 9.1.4 Progress of implementation of this Plan is reviewed annually and amended as required.	Maintain an effective Recovery Team to organise, implement, review and report on the recovery effort. The OBPRT will meet at least annually in one of the three range states on a rotational basis (Tas (1st and 4th) SA (2nd and 5th) Vic (3rd). Special meetings and/or phone conferences will be conducted as required. **Responsibilities** Implementation: The Chair of the OBPRT (9.1.1–9.1.4), OBPRT (9.1.5) Evaluation: OBPRT NRM Regions: N/A	High

Supporting actions continued

Action	Description	Tasks and Performance Criteria	
9.2	9.2.1 In the first year of this Plan, investigate and report on the feasibility of sharing aspects of the RPC position with another recovery program. 9.2.2 In the second year of the Plan appoint an RPC for the life of the Plan. 9.2.3 Develop an annual implementation plan and reporting structure. 9.2.4 Coordinate implementation of Recovery Plan actions in each year. 9.2.5 Report and review implementation as required.	Maintain recovery program coordination through the appointment of a Recovery Program Coordinator (RPC). The RPC will report directly to the OBPRT through its Chair and ensure OBPRT members fulfil their agreed responsibilities. The position includes liaison with appropriate government agencies, non-government organisations, Orange-bellied Parrot regional groups, Natural Resource Management regional groups and other stakeholders as is necessary. The framework for implementation of the Natural Heritage Trust objectives and the Recovery Plan will guide this. The tasks of the RPC include: • Identify management and conservation issues and communicate these to relevant people. • Coordinate the submission of grant applications and cooperative proposals to support the recovery process. • Facilitate the collation and analysis of data and its publication. • Facilitate implementation of high priority actions in each range State. • Develop and review time-lines for the completion of actions. • Report regularly to the OBPRT. The RPC will have the flexibility to allow strategic thinking, address issues across all States, and integrate tasks done by government departments and regional groups. The RPC, possibly a retired person, will be employed on a nominal retainer. **Responsibilities** Implementation: OBPRT (9.2.1–9.2.2), RPC (9.2.3–9.2.5) Evaluation: OBPRT and RPC NRM Regions: NA	High
9.3	9.3.1 Ensure listing reflects the conservation status across the range by year two of the Plan. 9.3.2 Listing status is considered at the end of year five of the Plan. 9.3.3 All habitat critical to the species is identified and, provided with appropriate protection under relevant jurisdictions.	Review status at year 5 of the species to reflect current knowledge and listing criterion. **Responsibilities** Implementation: Recovery Team and all State agencies (9.3.2–9.3.4) Evaluation: OBPRT and RPC NRM Regions: All relevant Vic, SA, NSW and Tas	High

Management Practices

More detailed information relating to management practices influencing the recovery of the Orange-bellied Parrot is contained in the *Background Information for the Orange-bellied Parrot.*

Protection and restoration of non-breeding habitat (winter and migration) is the primary focus of this recovery plan. Key management practices are:

- the placement and management of wind farms in all range States;
- estuary management, particularly in Victoria and South Australia;
- the decommissioning and land use of the Western Treatment Plant (Victoria);
- removal of stock and/or modification of grazing practices in coastal lands particularly in Tasmania;
- effective reduction of introduced predators and competitors;
- better understanding and management of toxic food plants and herbicides;
- effective control of recreational activities at key sites; and
- effective implementation of Commonwealth, State and local government legislation, particularly relating to land use planning at or adjacent to key Orange-bellied Parrot sites.

Important management practices within the breeding range include:

- successful implementation of prescribed burning to enhance foraging habitat in southwest Tasmania;
- effective reduction of introduced predators and competitors;
- effective control of visitor and development activities within the Tasmanian Wilderness World Heritage Area and Southwest Conservation Area; and
- careful management of founder stock to support the captive-breeding program.

Recovery Plan Timetable, Estimated Costs and Organisational Arrangements

Recovery plan timetable and estimated costs

The table below provides summary of recovery action components, priority, feasibility and funding requirements over the life of this Plan. Volunteer and in-kind contributions are not included in costing. Project Specific costs (PS) are not shown here due to variable funding requirements across different projects developed at the local and regional level.

Action	Priority	Feasibility	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1.1 Observations of marked birds within the breeding range	High	High	61.1	61.1	61.1	61.1	61.1	305.5
1.2 Monitor breeding productivity	High	High	20.1	17.7	17.7	19.2	17.7	92.4
1.3 Coordinate surveys of population in the winter range	High	High	24.9	24.9	24.9	24.9	24.9	124.5
1.4 Relationship between climatic variation, migration and breeding	High	High	1	0	0	0	0	1
2.1 Develop an integrated GIS site register of known and potential habitat	High	High	40.6	16.6	13.6	13.6	13.6	98
2.2 Surveys of winter and migratory habitat	High	Medium	24.9	24.9	24.9	24.9	24.9	124.5
2.3 Survey of entire breeding range	High	Medium	28.5	4.2	4.2	4.2	28.5	69.6
2.4 Develop methods and innovative techniques to identify key sites and migration behaviour	High	High	28	55	5	5	5	98
3.1 Review implement and effectiveness of management plans	Medium	High	10	1.4	1.4	1.4	1.4	15.6
3.2 Maintenance of foraging habitat at breeding sites through appropriate fire management	High	Medium	15	15	15	10	10	65
3.3 Provide, maintain and monitor nest boxes	High	High	34.3	23.9	23.9	23.9	34.3	140.3
3.4 Manage migratory habitat in Tasmania (including King Island)	High	Medium	90	7.5	7.5	7.5	16	128.5
3.5 Provide additional habitat at sites throughout the winter range	High	Medium	32.2	56.2	57.2	15.4	15.4	176.4
3.6 Test suitability of unoccupied winter habitat by release of captive birds	Medium	High						
3.7 Conduct trial of impact of grazing by sheep on the upper saltmarsh (SNCR)	High	Medium	26	14	14	0	0	54
4.1 Monitor and control of human disturbance at SNCR and Swan Island	High	High	5.6	0	0	0	0	5.6

Action	Priority	Feasibility	Year 1	Year 2	Year 3	Year 4	Year 5	Total
4.2 Collision risk structures	High	Medium	0	0	0	0	0	0
4.3 Determine impact of squid fishery and other light sources during migration	Medium	Medium	0	0	0	0	0	0
4.4 Control of introduced predators at migratory and wintering sites	Medium	Low	PS	PS	PS	PS	PS	PS
4.5 Impact of introduced bird competitors	Low	Low	0	5	0	0	0	5
4.6 Control of invasive weeds in native vegetation areas	High	Medium	14	14	14	6	6	54
4.7 Population Viability Analysis (PVA)	High	High	2	2	2	2	2	10
4.8 Management of aircraft and other human activities at Melaleuca	High	High	0	0	0	0	0	0
5.1 Maintain breeding population at Birchs Inlet	High	Medium	48.8	48.8	48.8	48.8	48.8	244
5.2 Identify other potential release sites within breeding range.	Medium	Medium	10	0	0	0	0	10
6.1 Management of captive breeding program.	High	High	1416.7	116.7	116.7	116.7	116.7	1883.5
6.2 Manage genetic diversity.	High	High	4.5	4.5	4.5	4.5	4.5	22.5
7.1 Develop and maintain communication pathways to meet the needs of stakeholders and the broader community	High	High	9	4	4	4	4	25
7.2 Support existing and establish new OBP regional groups.	High	High	42.1	54.1	54.1	54.1	54.1	258.5
7.3 Produce recovery program newsletter.	High	High	3.7	3.7	3.7	3.7	3.7	18.5
7.4 Coordinate volunteer involvement in recovery program.	High	High	8.4	8.4	8.4	8.4	8.4	42
8.1 Develop and implement a Recovery Fund Plan.	High	High	35	10	10	10	10	75
8.2 Develop a program to foster collaborative research activities at tertiary institutions.	High	High	0	0	0	0	0	0
9.1 Maintain an effective Recovery Team to organise, implement, review and report on recovery effort.	High	High	12	16.8	14.7	12	16.8	72.3
9.2 Maintain Recovery Program Coordination	High	Medium	11.3	31.3	31.3	31.3	31.3	136.5
9.3 Review listings throughout the range	High	High	0	0	0	0	0	0
Total funding requirements			**2065.1**	**645.7**	**582.6**	**512.6**	**559.1**	**4365.1**

Organisational arrangements

The Orange-bellied Parrot Recovery Team is responsible for overseeing and reviewing progress of the recovery program in conjunction with project staff identified against each recovery action. In most instances responsibility for implementation of actions contained within this Plan rests with State conservation agencies and, to varying degrees, with NRM/CMAs throughout the species' range. It is anticipated funding for many of the actions within this plan will be sourced from NRM/CMAs, particularly within the core range, and successful implementation will rely on the formation of integrated partnership with other conservation programs. This plan contains a range of actions, which should be considered for implementation at the regional level. The table below identifies NRM/CMAs responsible for implementation of actions and the priority of each action.

NRM Region/Group Name	High Priority	Medium Priority	Low Priority
New South Wales			
Sydney Metro CMA	2.1, 2.3, 3.5, 4.3, 7.1, 7.2, 9.3	3.1	4.5
Southern Rivers CMA	2.1, 2.3, 3.5, 4.3, 7.1, 7.2, 9.3	3.1	4.5
South Australia			
SA Murray Darling Basin INRM	1.3, 2.1, 2.3, 3.5, 4.3, 7.1, 7.2, 9.3	3.1	4.5
South East INRM	1.3, 2.1, 2.3, 3.5, 4.3, 7.1, 7.2, 9.3	3.1	4.5
Tasmania			
Cradle Coast NRM	1.1, 1.2, 1.3, 2.1, 2.3, 2.4, 3.2, 3.3, 3.4, 4.3, 5.1, 7.1, 7.2, 9.3	3.1	4.5
Southern NRM	1.1, 1.2, 2.1, 2.4, 3.2, 3.3, 4.1, 4.3, 7.1, 7.2, 9.3	3.1	4.5
Victoria			
Corangamite CMA	1.3, 2.1, 2.3, 3.5, 4.3, 7.1, 7.2, 9.3	3.1, 3.6	4.5
East Gippsland CMA	1.3, 2.1, 2.3, 3.5, 4.3, 7.1, 7.2, 9.3	3.1, 3.6	4.5
Glenelg Hopkins CMA	1.3, 2.1, 2.3, 3.5, 4.3, 7.1, 7.2, 9.3	3.1, 3.6	4.5
Port Phillip and Western Port CMA	1.3, 2.3, 3.5, 3.7, 4.2, 4.3, 7.1, 7.2, 9.3	3.1, 3.6	4.5, 4.7
West Gippsland CMA	1.3, 2.1, 2.3, 3.5, 4.3, 7.1, 7.2, 9.3	3.1, 3.6	4.5

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Appendix 1 Abbreviations used in the Recovery Plan

AEMA	Adaptive experimental management approach
AGDEW	Australian Government Department of the Environment and Water Resources (previously Australian Government Department of the Environment and Heritage)
AZ	Adelaide Zoo
BSPO	Breeding Season Project Officer
CMA	Catchment Management Authority
CMC	Captive Management Coordinator
CMG	Captive Management Group
DEH	South Australian Department for Environment and Heritage
DPIW	Tasmanian Department of Primary Industries and Water
DSE	Victorian Department of Sustainability and Environment
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
HS	Healesville Sanctuary
INRM	Interim Natural Resource Management Region
NRM	Natural Resource Management
NSW	New South Wales
NSWNPWS	New South Wales National Parks and Wildlife Service
OBP	Orange–bellied Parrot
OBPRT	Orange–bellied Parrot Recovery Team
PWS	Tasmanian Parks and Wildlife Service
RFP	Recovery Fund Plan
RPC	Recovery Plan Coordinator
SA	South Australia
SNCR	Spit Nature Conservation Reserve
Tas	Tasmania
TUC	Trumped–up Corella
Vic	Victoria
WSPO	Winter Season Project Officer
WTP	Melbourne Water's Western Treatment Plant


Australian Government


Tasmania


State Government
Victoria
Department of
Sustainability
and Environment


SOUTH AUSTRALIA
Government
of South Australia


NSW National Parks
and Wildlife Service