REGENT HONEYEATER

RECOVERY PLAN

1999 - 2003

Prepared on behalf of the Regent Honeyeater Recovery Team by

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CONTENTS Page

Summary 3

Introduction 6
Description 6
Distribution and Movement Patterns 6
Abundance 6
Habitat and Diet 7
Life History and Movements 8
Reasons for Conservation Status 9
Current Status 9
Existing Conservation Measures 10
Wider Conservation Issues 11

Recovery Objectives 11
Long-term Objectives 11
Specific Objectives 11
Recovery Criteria 11
Actions Required for Each Objective 12
Funding Explanation 12

Recovery Actions 15
Organisational Arrangements 15
Active Management 17
Monitoring 18
Research 19
Community Participation and Awareness 21
Captive Management 22
Review of Progress 24

Acknowledgments 24

Bibliography 24

SUMMARY

Current Species Status

The Regent Honeyeater is classified as endangered under the Commonwealth *Endangered Species Protection Act 1992* and under Queensland's *Nature Conservation Act 1992*. In Victoria the Regent Honeyeater has been listed as a threatened taxon in Schedule 2 of the *Flora and Fauna Guarantee Act 1988* and in New South Wales it is classified as endangered under Schedule 1, Part 1 of the *Threatened Species Conservation Act, 1995*.

Under the IUCN Red List categories the Regent Honeyeater should be classified as Endangered (criterion C 2b).

Habitat Requirements and Limiting Factors

Regent Honeyeaters occur mainly in box-ironbark open-forests and riparian stands of *Casuarina* on the inland slopes of the Great Dividing Range. At times significant numbers also occur in coastal forests in NSW and eastern Victoria. Particularly when breeding, Regent Honeyeaters require access to nectar or another form of sugary plant exudate such as lerps or honeydew. A few species of *Eucalyptus* and a mistletoe (*Amyema cambagei*) seem to be important in providing reliable and relatively predictable nectar flows. Lack of access to these dependable nectar flows at critical times, due to clearance of the most fertile stands, the poor health of many remnants, and competition for nectar from other honeyeaters, may be a major cause of the decline of this species.

Recovery Objectives

A LONG-TERM [to be achieved within two decades]

1. To ensure that the species persists in the wild.
2. To achieve a down-listing from nationally endangered to vulnerable by stabilising the population decline and securing habitat extent and quality in the main areas of occupancy.
3. Achieve increasing reporting rates (5% per annum) in areas previously used regularly, eg Munghorn Gap (NSW), Bendigo, north-east Melbourne and the Eildon area (VIC).

B SPECIFIC OBJECTIVES [within the life of this plan]

OBJECTIVE 1. Effectively organise and administer the recovery effort to ensure that recovery plan objectives are met

OBJECTIVE 2. Maintain and enhance the value of Regent Honeyeater habitat at the key sites and throughout the former range, by active participation in land-use planning processes and by active vegetation rehabilitation at strategic sites.

OBJECTIVE 3. Monitor trends in the Regent Honeyeater population size and dispersion across its range to allow assessment of the efficacy of management actions.

OBJECTIVE 4. Facilitate research on strategic questions which will enhance the capacity to achieve the long-term objectives. In particular, determine the whereabouts of Regent Honeyeaters during the non-breeding season and during breeding season absences from known sites. Identify important sites and habitat requirements at these times.

OBJECTIVE 5. Maintain and increase community awareness, understanding and involvement in the recovery effort.

OBJECTIVE 6. Maintain the captive population of Regent Honeyeaters at a size which will provide adequate stock to: provide insurance against the demise of the wild population; continuously improve captive-breeding and husbandry techniques; provide adequate stock for trials of release strategies; and maintain 90% of the wild heterozygosity in the captive population.

Recovery Criteria

1. Progress towards meeting all objectives is efficiently achieved with high levels of community and Government support and little conflict.
2. All areas of core breeding habitat covered by an Operations Group work plan. Four Operations Groups successful in obtaining funding to implement their regional works plans by December 1999.
3. Achievement of a statistically valid measure of trends in population size and understanding of trends in area of occupancy.
4. Identification of areas and habitats utilised during non-breeding periods by birds from each of the three major breeding areas (Bundarra-Barraba, Capertee Valley and north-east Victoria).
5. Increasing community participation in the recovery effort, particularly via Operations Groups.
6. Maintenance of the captive colony to the standards of a Category 1 species under the Australasian Species Management Program (Johnson *et al*. (1998). Production of at least 15 young per year. Trials of hard-release techniques undertaken.

Actions Needed

1. Project management: continue to manage the Recovery Team and full-time Coordinator; increase the contribution of the NSW Government to program management; encourage greater input from the Queensland and ACT wildlife agencies; encourage and direct the contributions of Operations Groups centred on regions containing key habitat; increase the effectiveness of collaboration with the Swift Parrot Recovery Team.
2. Habitat management: Rehabilitation and revegetation are best achieved by facilitating community ownership and participation in these activities. Expand the composition, influence and resources of Operations Groups in the four key regions so that they are able to implement regional works plans; prepare regional guidelines for management of Regent Honeyeater habitat, ensure that regional ecosystem management plans take account of the guidelines and promote them to landholders and agency staff. Obtain agreements to undertake cooperative work with landholders to alleviate threats. Prepare bids for funding from Bushcare to allow Operations Groups to shoulder there increased responsibilities. Where shown to be necessary, active management of populations of predators and competitors should be undertaken.
3. Population monitoring: initiate a population monitoring program at the three main breeding areas; take full advantage of the existing sightings database and the Birds Australia Bird Atlas Project to elucidate distribution patterns and the magnitude of the range reduction over recent decades.
4. Ecological research: initiate innovative research into movement patterns, particularly post breeding, and the degree of isolation between breeding populations; investigate the impact of Noisy Miners on population stability and undertake a comparison of resource utilisation between northern NSW and Victoria.
5. Community education and participation: conduct a public education program about the species and its requirements, aimed particularly at developing habitat management partnerships with land owners within the range of the species; establish an educational Regent Honeyeater exhibit at Taronga Zoo. Produce a semi-annual newsletter.
6. Captive management: maintain a viable captive population, spread across at least three ARAZPA institutions, to act as insurance against the demise of the wild population; conduct trials of hard-release techniques; complete the captive husbandry manual and a guide to aging and sexing Regent Honeyeaters.

Estimated Cost of Recovery

Total funds required to implement this plan (in $ x 1000). Contributing agencies include NHT, NRE, NSW NPWS, NSW DLWC, Taronga Zoo, five volunteer operations groups, University of New England, La Trobe University and Birds Australia.

Actions	1	2	3	4	5	6	Total
1999	130.6	139.9	47.5	11.0	53.0	19.3	404.1
2000	129.9	137.5	30.5	77.0	55.0	39.0	471.1
2001	132.2	135.2	30.5	27.0	54.0	27.0	405.7
2002	133.7	135.2	30.5	68.0	59.0	29.0	453.0
2003	136.8	135.2	30.5	7.0	59.0	15.0	381.1
Total	663.2	683.0	169.5	190.0	280.0	129.3	2116

Biodiversity Benefits:

Because of its high profile in recent years the Regent Honeyeater has become a ‘flagship species’ for conservation issues in the box-ironbark forest region of Victoria and New South Wales (eg. Garnett 1992b). The extent of vegetation clearance and degradation in this bioregion is as high as in any other region in Australia (Muir et al. 1995, Robinson and Traill 1996). Thus, efforts to conserve the Regent Honeyeater will help to conserve remnant communities of flora and fauna throughout the species range. Several other threatened or uncommon species will also benefit from the actions detailed in this plan, including Brush-tailed Phascogale, Squirrel Glider, Bush Stone-curlew, Swift Parrot and Painted Honeyeater. Many other taxa which are declining but not yet listed as threatened will also benefit, for example Hooded Robin, Speckled Warbler and Black-chinned Honeyeater.

INTRODUCTION

This is the second recovery plan prepared for the Regent Honeyeater (*Xanthomyza phrygia* Shaw 1794). The first (Menkhorst 1997) was refined by the Regent Honeyeater Recovery Team from a draft produced in 1994 by P. Menkhorst and accepted for funding by the Endangered Species Program of Environment Australia. The objectives, criteria and actions in this second plan were developed at a two-day workshop held in Canberra in February 1998. This workshop was attended by most members of the Recovery Team and two independent contributors. An independent review (Rounsevell 1997) of the efficacy of the first plan, and progress towards its implementation, was commissioned by the team and made available to participants prior to the workshop. Thus, we have some confidence that this second plan accurately reflects the combined wisdom and priorities of the team, as well as appropriate outside practitioners in endangered species recovery. It builds upon the first plan, giving cognisance to our greatly improved knowledge of the species, and our changing priorities as objectives in the first plan were achieved, or altered, in the light of our experiences over the past five years.

Description

The Regent Honeyeater is a medium-sized honeyeater (Family Meliphagidae) inhabiting drier open-forests and woodlands in south-eastern Australia. Adults weigh 38 to 50 g. Plumage colouration is predominantly black with bright yellow edges to tail and wing feathers. Body feathers, except for the head and neck, are broadly edged in pale yellow or white (Longmore 1991). The overall visual impression is of a blackish bird boldly embroidered with yellow and white, with brilliant yellow flashes in wings and tail. A large patch of bare, buff-coloured, warty skin surrounds each eye.

Distribution and Movement Patterns

The Regent Honeyeater was formerly distributed within about 300 km of the eastern Australian coast from approximately 100 km north of Brisbane to Adelaide (Franklin *et al.* 1989); however, it is no longer found in South Australia (Franklin and Menkhorst 1988) or western Victoria (Franklin *et al.* 1987) and records from Queensland are uncommon. Within this reduced distribution population dispersion is also extremely patchy, and little information is available on movement patterns of this highly mobile species.

Regent Honeyeaters occur mainly in dry open-forest and woodland in areas of low to moderate relief on the inland (western) slopes of the Great Dividing Range. They occur frequently in broad valleys extending into the ranges. Coastal areas of New South Wales (NSW), including the northern, central and southern coasts, and East Gippsland in Victoria are also visited.

Although patterns of seasonal movement are poorly understood, a degree of regularity at some sites where Regent Honeyeaters are well-known to occur (as postulated by Franklin *et al*. 1989), has been confirmed (Ley and Williams 1994, Ley *et al.* 1996, Geering and French 1998). Collation of observational records of Regent Honeyeaters, and further targeted surveys during implementation of the first recovery plan, have highlighted the importance of Swamp Mahogany forests in coastal NSW as refuge areas when conditions on the inland slopes are unfavourable. Apart from that, no major new regularly-used sites were located away from those identified by Franklin *et al.* (1989) and Webster and Menkhorst (1992). Indeed, usage of Warrumbungle National Park, NSW, and Killawarra Forest and the Benalla area in Victoria may have declined. However, it is almost certain that the currently-available data under-represent the importance of some regions or habitats.

Abundance

Density measurements are extremely difficult to obtain, and probably of little meaning, for a highly mobile species thinly spread over large areas of eastern Australia. During a survey conducted between 1988 and 1990 (Webster and Menkhorst 1992), 299 sightings were recorded from 51 separate localities. It is estimated that no more than 102 individuals were observed during 1988-89 and no more than 145 during 1989-90. Most sightings involved small numbers of birds - 30% of observations were of one individual and 31% of two; 88% of observations were of four or less. Flocks of 10 or more Regent Honeyeaters were found on eight occasions (2.7%) and the largest aggregations were of 23 birds at both Austins Crossing in NSW and Reef Hills Park in Victoria (Webster and Menkhorst 1992).

However, since the beginning of the current recovery effort several large aggregations have been found. During May 1994, 151 birds were present at Howes Valley, NSW (Menkhorst 1997, Oliver 1998a). At the same time there were 47 at Warrumbungle National Park, giving a total known population of about 200 birds. During spring 1997 at least 400 Regent Honeyeaters were present in the Capertee Valley, NSW and, based on the proportion of colour-banded birds present, the actual population may have been closer to 800 (D. Geering unpublished data). During the same breeding season population estimates for the Bundarra-Barraba region, based on the number of breeding pairs found, extrapolated across the available habitat, suggest a maximum of 520 birds (Oliver 1998b). Therefore, the total population may be close to or greater than the upper limit of 1500 suggested by Webster and Menkhorst (1992).

Habitat and Diet

Most records of the Regent Honeyeater have come from box-ironbark eucalypt associations and it seems to prefer wetter, more fertile sites within these associations, such as along creek flats, broad river valleys and lower slopes. Along streams in NSW, riparian forests of River She-oak *Casuarina cunninghamiana* are also important for feeding and breeding.

A large proportion of these forest types has been cleared for agriculture, leaving only patches of natural vegetation in a predominantly agricultural landscape. These remnants are frequently located on the least fertile sites and have been heavily harvested for timber in the past. In Victoria, stands of immature, even-aged and slow-growing box-ironbark forests totalling some 250 000 ha, mostly on less fertile soils, are all that remain of roughly one million hectares that were present at the time of European occupation (Muir *et al*. 1995). There are no examples of uncut, old-growth box-ironbark woodland remaining. A similar, though less critical, situation exists in NSW.

The other major environment regularly utilised by Regent Honeyeaters, perhaps largely as a drought refuge, is wet lowland coastal forest dominated by Swamp Mahogany *Eucalyptus robusta* or Spotted Gum *E. maculata*. Swamp Mahogany forests are being increasingly reduced and fragmented by development along the NSW coast.

Two earlier studies (Franklin *et al.* 1989, Webster and Menkhorst 1992) highlighted the reliance of the Regent Honeyeater on nectar from a small number of eucalypt species - Mugga Ironbark *E. sideroxylon*, White Box *E. albens*, Yellow Box *E. melliodora* and Yellow Gum *E. leucoxylon* (note that the most highly preferred ironbark species is *E. sideroxylon*, which occurs through NSW and north-east Victoria, and not *E. tricarpa*, the form occurring across central Victoria and Gippsland). Recent studies by Geering (1997) and Oliver (1998b), while adding to the number of eucalypt species from which Regent Honeyeaters obtain nectar, have reinforced the significance of nectar from Mugga Ironbark, White Box and Yellow Box. In NSW, Regent Honeyeaters also regularly take nectar from Needle-leaf Mistletoe (*Amyema cambagei*) growing on River She-oak (Webster and Menkhorst 1992, Geering and French 1998, Oliver in press) and from Swamp Mahogany on the Central Coast (Franklin *et al.* 1989 (table 5), A. Morris pers comm.). These vegetation communities may be very significant habitats in some years.

Regent Honeyeaters sometimes occur, and even breed, at sites where nectar is not readily available. In such circumstances they utilise other sugary plant or insect exudates, including honeydew and lerps (Davidson 1992, Oliver 1998d). Indeed, the large aggregation at Howes Valley in May 1994 was feeding mainly on insects and lerps for several months (Oliver 1998b).

Insects and other arthropods also form an important component of the diet and are obtained by gleaning in foliage and flowers, probing behind bark and ground litter, and aerial snatching and hawking (Franklin *et al.* 1989, Webster and Menkhorst 1992, Davis and Recher 1993, Ford *et al.* 1993, Oliver 1998b). Insects are essential during breeding when they form an important component of the diet of nestlings and fledglings (Oliver 1998d).

White Box, Yellow Box and Yellow Gum grow on fertile soils on gently sloping foothills and plains and have all suffered extensively through clearing for agriculture. Mugga Ironbark has perhaps suffered less because it also grows on less fertile sites such as ridges and hilltops. Stands of these species growing on high quality sites where nectar production is copious and relatively predictable appear to be critical to the survival of the Regent Honeyeater. These stands include small, isolated patches growing in agricultural areas, as well as patches in extensive state forests or conservation reserves. Two studies have also noted a

preference by the Regent Honeyeater for large emergent trees (Webster and Menkhorst 1992, Oliver 1998b, Oliver in press). This suggests that past silvicultural treatment of many box-ironbark woodlands, intended to produce dense pole stands which are still immature, may have removed much favourable habitat, especially in Victoria. Tree decline in agricultural and pastoral land has also depleted the quality of remnant stands.

Life History and Movements

During the first five years of the recovery effort a significant improvement in knowledge of the life history of the Regent Honeyeater was achieved (Ley and Williams 1994, Ley et al 1996, Geering 1997, Geering and French 1998, Oliver et al. 1998, Oliver 1998b). A major remaining deficiency is the lack of understanding of the whereabouts of birds when they are absent from the known regular sites.

The annual cycle of the Regent Honeyeater at the three main areas of occurrence includes some common elements: arrival in the area in autumn or early winter and occurrence in loose flocks, often including communal roosting (Oliver 1998a); subsequent breeding through spring and early summer, often as aggregations of pairs; and disappearance in mid- to late-summer after young have fledged. There is also some evidence of coastward movement during the non-breeding period (eg Hindwood 1944), particularly when dry conditions prevail on the inland slopes of the Great Dividing Range.

Colour-banding of birds captured at the three main breeding sites is beginning to elucidate details of movement and breeding patterns. At both Bundarra-Barraba and Capertee Valley, colour-banded birds have re-nested in the same season up to 45 km distant from their first nesting site (Ley *et al.* 1996, Geering and French 1998). Some birds also change breeding sites from one season to another, for example, two of seven birds banded as breeding adults in Canberra in December 1995 were found breeding at Capertee Valley during the summer of 1997/98. Conversely, birds have also returned to the same small area to breed in subsequent years (Ley *et al.* 1996, Geering and French 1988). The oldest retraps of banded Regent Honeyeaters indicate a longevity of at least six years seven months and a breeding life of at least 4 years (Menkhorst unpublished data).

In Victoria, nesting occurs mainly between November and January but breeding has been recorded in all months between July and February (Franklin *et al.* 1989). In the Bundarra district of NSW breeding occurs between mid August and January (Ley and Williams 1994) and in the Capertee Valley, NSW, egg laying has been recorded in September and October (Geering and French 1998). Nests are constructed from strips of eucalypt bark, often from stringybark species, dry *Casuarina* branchlets, dry grass, twigs and spider web. They are placed in an upright fork between 3 and 30 m above ground and 2-3 eggs are laid. At Capertee Valley in 1995 and 1996 the mean height of 144 nests was 14.3 +/- 6.2 m (range 3-30). Mean clutch size in 18 monitored nests was 2.2 +/- 0.43 and 22% of clutches comprised three eggs. The incubation period was 14 days and the fledgling period varied from 12 to 21 days but was mostly 16 days. The number of fledglings produced per successful nest was around 1.9 in *Casuarina* gallery forest and 1.4 in remnant trees in paddocks. In the Bundarra-Barraba area between 1993 and 1997, rough-barked eucalypts were preferred as nest sites and the mean height of nests was 13.4 +/- 3.6 m (Oliver *et al.* 1998). Overall nest success of 51 nests was 38.3% (Mayfield method) with a mean of 2.1 +/- 0.8 young fledged per successful nest (Oliver *et al.* 1998).

Earlier concern that the reproductive potential of the species may not be high compared to many other honeyeaters (Menkhorst 1997) has been shown to be misplaced. Monitoring of breeding at Bundarra-Barraba (Ley *et al*. 1996, Oliver *et al*. 1998) and Capertee Valley (Geering and French 1998) indicates that while breeding effort and success varies between sites and years, it is similar to that reported for other honeyeaters (Ford 1989). Re-nesting after both failed and successful first nests has been confirmed at Bundarra-Barraba and Capertee Valley (Ley *et al*. 1996, Geering and French 1998). In recent years breeding success at Chiltern has been low and the causes of this require further investigation.

At times the Regent Honeyeater's apparent reliance on eucalypt nectar from a few key species predisposes it to suffering competition for nectar from other nectarivorous birds and the honeybee; apiarists also consider the 'key' eucalypts to be good nectar producers. Increased competition from other nectarivores resulting from habitat fragmentation, and a reduction in the number of high quality sites, caused by clearance of vegetation for agriculture, has been postulated as a major factor in the decline of this species

(Franklin *et al.* 1989, Franklin and Robinson 1989, Davis and Recher 1993, Ford *et al.* 1993). However, studies by Oliver (1998b) support the tentative conclusion of Webster and Menkhorst (1992) that aggression between nectarivores is not at a level which is likely to reduce survivorship or breeding success to a significant degree.

A related but different threat is the possible exclusion of Regent Honeyeaters from habitat patches by the Noisy Miner *Manorina melanophrys* (Grey et al. 1997, 1998). In Victoria and southern NSW a large proportion of White Box and Yellow Box woodlands are dominated by colonies of the Noisy Miner, and Regent Honeyeaters may not have ready access to such habitat.

Reasons for Conservation Status

The Regent Honeyeater is the only member of the genus *Xanthomyza*. Its morphology does not vary across its range (Schodde *et al.* 1992) and preliminary studies of both nuclear and mitochondrial DNA did not detect significant regional population subdivision (Norman and Christidis 1998). Therefore, on the grounds of phylogenetic distinctness alone, the Regent Honeyeater warrants high priority for conservation action.

Recent surveys clearly indicate that the range of the Regent Honeyeater has contracted significantly. It no longer occurs in South Australia (Franklin and Menkhorst 1988), is now a rare and sporadic visitor to the Bendigo area of central Victoria (Franklin *et al.* 1987) where it was formerly common (Ryan 1951, 1981), and to Gippsland where it was formerly a regular spring and summer visitor (J. Galbraith pers. comm.). All distribution and monitoring data collected during the first phase of the recovery effort support the conclusions of Webster and Menkhorst (1992) regarding the patchiness and magnitude of the population. Larger aggregations have been located but, with one exception (Howes Valley), they were confined to the major breeding locations.

A concerted attempt to collate details of all reported sightings of the Regent Honeyeater during implementation of the first recovery plan has reinforced the significance of the key regions identified by Webster and Menkhorst (1992). However, the significance of Swamp Mahogany forests along the Central Coast of NSW has been highlighted, and usage of Warrumbungle National Park (NSW), Killawarra Forest and Lurg (Vic) may have declined.

The major arguments for concern about the status of the Regent Honeyeater can be summarised as:

- specialised habitat requirements
- significant reductions in extent of habitat
- demonstrable reduction in habitat quality throughout its range
- apparent reliance on a small number of favoured sites
- clear reduction in range in recent decades (probably on-going in central Victoria)
- low population level (Webster and Menkhorst (1992) estimated the population at between 500 and 1500; data collected subsequently suggest that 800-2000 may be closer)
- low population densities over a large proportion of the range with aggregations occurring for breeding
- there are no obvious, straightforward or quick solutions to the postulated causes of the population decline. Only long-term changes to land management, on both public and private land, will lead to a significant improvement (eg. Ley and Williams 1992).

Current Status

Garnett (1992a)	Endangered
NRE 1998a	Endangered
Environment Australia (1998)	Endangered

The Regent Honeyeater is classified as Endangered under the Commonwealth *Endangered Species Protection Act 1992* and under Queensland's *Nature Conservation Act 1992*. In Victoria the Regent Honeyeater has been listed as a threatened taxon in Schedule 2 of the *Flora and Fauna Guarantee Act 1988* and in New South Wales it is classified as endangered on Schedule 1 of the *Threatened Species Conservation Act 1995*.

The IUCN Red List categories are extremely difficult to apply in a meaningful manner to the Regent Honeyeater. This is mainly due to the difficulty of defining the range, area of occupancy, population size and population trends for this highly mobile and thinly-spread species. However, under the criteria of IUCN (1994) the Regent Honeyeater ranks as endangered at the national level because the population is estimated to number less than 2500 mature individuals, a continuing decline in the number of mature individuals is projected due to continuing habitat deterioration, and all individuals are in a single subpopulation (criterion C 2b of IUCN 1994). However, further information on population size and trends, area of occupancy, degree of reliance on the regularly-used sites, and the levels of movement between breeding groups, are necessary before a definitive assessment can be made. The actions in this plan will improve our understanding of these matters.

Existing Conservation Measures

Concerns about the conservation status of the Regent Honeyeater were first raised in the late 1970s (Peters 1979). Between 1983 and 1987 an intensive questionnaire and literature survey was conducted to collate information on all past and current sightings of the species. The results provided the first details of the ecology of the Regent Honeyeater (Franklin *et al.* 1989). They also indicated a clear contraction of its range in South Australia and western Victoria (Franklin *et al.* 1987, Franklin and Menkhorst 1988) and a reduction in the frequency and size of aggregations.

Based partly on the results of this work, the Australian National Parks and Wildlife Service funded a two-year field survey of the species in Victoria and New South Wales. This survey, which was conducted by the then Wildlife Branch CNR, drew heavily on reports of Regent Honeyeaters from bird-watchers throughout south-east Australia. The study finished in April 1990 and recommendations based on the results of that study and the previous studies were formulated by the steering committee, and subsequently revised following extensive consultation within NRE and the New South Wales Forestry Commission (Webster and Menkhorst 1992).

These recommendations, which include the exclusion of timber extraction, mining and grazing from areas identified as regularly-used sites, formed the basis of a ‘Guideline’ in the NRE Wildlife Manual and of the Flora and Fauna Guarantee Action Statement (DCE 1991, Menkhorst 1993). They are now being implemented at important sites in north-eastern New South Wales by State Forests of NSW and will form the basis of management guidelines and prescriptions for this species in the NSW National Parks and Wildlife Service ‘Manual of Schedule 12 Species’.

In May 1990 staff of the North East Area, NRE, located up to 30 Regent Honeyeaters on freehold land near Lurg. Aggregations of birds were also present at this site in the subsequent four winters. Local landholders were informed of the significance of their land and its remnant eucalypts and the need for protection. This area was then targeted by the local LandCare group for establishment of corridors of the ‘key’ tree species linking existing remnant stands. This has since developed into an intensive revegetation effort (Willett 1993) involving more than 20 properties and hundreds of volunteers who propagate and plant indigenous trees, shrubs and ground cover species. Through this process more than 54 000 plants have been planted and 30 km of fencing installed. Detailed mapping of remnant habitat at Lurg has been undertaken by staff of the North East Area, NRE. This information has been used to guide revegetation priorities and to analyse preferences by Regent Honeyeaters for remnants of differing size and shape (Mann and Davidson 1993).

In 1991 and 1992 areas of freehold land west of the Yarrambat Golf Course which are regularly visited by Regent Honeyeaters were acquired by Melbourne Water Corporation to be added to the Plenty Gorge Park.

Near Bundarra, north-eastern NSW, the Northern NSW Group of Birds Australia used funds from the Save the Bush Program to undertake public education and revegetation works in strategic Travelling Stock Reserves and freehold land (Ley and Williams 1992). They have also mapped remnant box/ironbark woodland and liaised with landholders to improve management of these remnants. Similarly, the Southern NSW and ACT Group of Birds Australia obtained funding from the NSW Environmental Trust Fund to undertake extensive habitat enhancement and extension work in the Capertee Valley.

As part of implementation of the first recovery plan, Operations Groups have been established to help implement the recovery plan in the Bundarra-Barraba, Capertee Valley and Central Coast districts of NSW, and the Chiltern and Lurg districts in Victoria.

Breeding Regent Honeyeaters are being studied by the Northern NSW Group of Birds Australia (Ley 1990, Ley and Williams 1994, Ley *et al.* 1996), by researchers from the University of New England (Davis and Recher 1993, Ford *et al.* 1993, D. Oliver *et al.* 1998, Oliver 1998c), by the Southern NSW and ACT Group of Birds Australia (Geering 1997, Geering and French 1998) and by the Chiltern Operations Group (Collins and Jessup unpublished data).

Wider Conservation Issues

Progress towards achieving the major conservation objectives will be entirely compatible with the aims of the Victorian Biodiversity Strategy (NRE 1998b). It will also complement several other Government programs including the Native Vegetation Retention planning controls (Vic), Greening Australia, Tree Victoria, LandCare, Salinity Management and Land for Wildlife. Several other threatened or uncommon species will also benefit from the actions detailed in this plan, including Brush-tailed Phascogale, Squirrel Glider, Bush Stone-curlew, Swift Parrot, Grey-crowned Babbler and Painted Honeyeater. Further, it is now believed that a large number of bird species in eucalypt woodlands are undergoing a prolonged decline (Recher and Lim 1990, Robinson 1993, Robinson and Traill 1996) and this plan will also benefit those species.

RECOVERY OBJECTIVES

The objectives, criteria and actions proposed in this recovery plan build on those in the first plan (Menkhorst 1997) and conform with and extend those of DCE (1991), Webster and Menkhorst (1992), Garnett (1992a), Menkhorst (1993), Robinson (1995) and Robinson and Trail (1996). They are based on a thorough review of the biological and ecological information available at the time of writing. However, it is emphasised that our knowledge of the habitat requirements of the Regent Honeyeater, and of seasonal or drought-induced movements, is still deficient, and that the adequacy of these actions will need to be reassessed as new information becomes available.

Long-Term Objectives [to be achieved within two decades]

1. To ensure that the species persists in the wild.
2. To achieve a down-listing from nationally endangered to vulnerable by stabilising the population and securing habitat extent and quality in the main areas of occupancy.
3. Achieve increasing reporting rates (5%) in areas previously used regularly, eg Munghorn Gap, Bendigo, north-east Melbourne, Eildon area.

Specific Objectives [within the life of this plan]

OBJECTIVE 1. Effectively organise and administer the recovery effort to ensure that recovery plan objectives are met.

OBJECTIVE 2. Maintain and enhance the value of Regent Honeyeater habitat at the key sites and throughout the former range, by active participation in land-use planning processes and by active vegetation rehabilitation at strategic sites

OBJECTIVE 3. Monitor trends in the Regent Honeyeater population size and dispersion across its range to allow assessment of the efficacy of management actions.

OBJECTIVE 4. Facilitate research on strategic questions which will enhance the capacity to achieve the long-term objectives. In particular, determine the whereabouts of Regent Honeyeaters during the non-breeding season and during breeding season absences from known sites. Identify important sites and habitat requirements at these times.

OBJECTIVE 5. Maintain and increase community awareness, understanding and involvement in the recovery effort.

OBJECTIVE 6. Maintain the captive population of Regent Honeyeaters at a size which will provide adequate stock to: provide insurance against the demise of the wild population; continuously improve

captive-breeding and husbandry techniques; provide adequate stock for trials of release strategies; and maintain 90% of the wild heterozygosity in the captive population.

RECOVERY CRITERIA

1. Progress towards meeting all objectives is efficiently achieved with high levels of community and Government support and little conflict.
2. All areas of core breeding habitat covered by an Operations Group work plan. Four Operations Groups successful in obtaining funding to implement their regional works plans by December 1999.
3. Achievement of a statistically valid measure of trends in population size and understanding of trends in area of occupancy.
4. Identification of areas and habitats utilised during non-breeding periods by birds from each of the three major breeding areas (Bundarra-Barraba, Capertee Valley and north-east Victoria).
5. Increasing community participation in the recovery effort, particularly via Operations Groups.
6. Maintenance of the captive colony to the standards of a Category 1 species under the Australasian Species Management Program (Johnson *et al*. (1998). Production of at least 15 young per year. Trials of hard-release techniques undertaken.

ACTIONS REQUIRED FOR EACH OBJECTIVE

1. Project management: continue to manage the Recovery Team and full-time Coordinator; increase the contribution of the NSW Government to program management; encourage greater input from the Queensland and ACT wildlife agencies; encourage and direct the contributions of Operations Groups centred on regions containing key habitat; increase the effectiveness of collaboration with the Swift Parrot Recovery Team.
2. Habitat management: expand the composition, influence and resources of Operations Groups in the four key regions so that they are able to implement regional works plans; prepare regional guidelines for management of Regent Honeyeater habitat and promote them to landholders and agency staff; ensure that regional ecosystem management plans take account of the guidelines. Obtain agreements to undertake cooperative work with landholders to alleviate threats.
3. Population monitoring: initiate a population monitoring program at the three main breeding areas; take full advantage of the existing sightings database and the Birds Australia Bird Atlas Project to elucidate distribution patterns and the magnitude of the range reduction over recent decades.
4. Ecological research: initiate innovative research into movement patterns, particularly post breeding, and the degree of isolation between breeding populations; investigate the impact of Noisy Miners on population stability and undertake a comparison of resource utilisation between northern NSW and Victoria.
5. Community education and participation: conduct a public education program about the species and its requirements, aimed particularly at developing habitat management partnerships with land owners within the range of the species; establish an educational Regent Honeyeater exhibit at Taronga Zoo; produce a semi-annual newsletter.
6. Captive management: maintain a viable captive population, spread across at least three ARAZPA institutions, to act as insurance against the demise of the wild population; conduct trials of hard-release techniques; complete the captive husbandry manual and a guide to ageing and sexing Regent Honeyeaters.

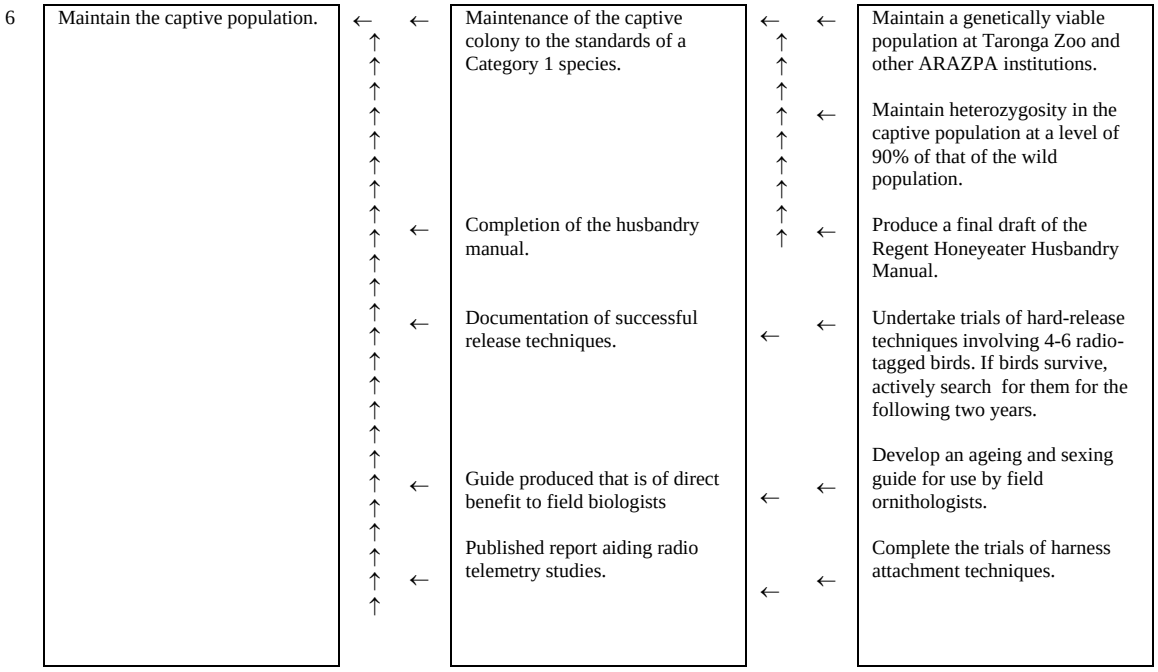
FUNDING EXPLANATION

The Regent Honeyeater recovery effort has been a successful collaboration between Environment Australia, resource management agencies in two States, Taronga Zoo, bird research and conservation groups and five voluntary community Operations Groups. All have made significant contributions, in cash and in kind, to the operation of the recovery effort. The value of the contributions by the five voluntary Operations Groups during 1997 alone is estimated at $130 000.

Table 1. Summary of specific objectives, criteria for achieving those objectives and the actions designed to satisfy the objectives.

	Specific Objectives	Criteria	Actions
1	Effectively organise and administer the recovery effort.	Objectives achieved with high levels of community and Government support.	Recovery team to guide, evaluate and review implementation. Administrative workload to be shared equitably between NRE in Victoria and NPWS in NSW. Increase the contributions of the Qld and ACT Governments to the recovery effort. Appoint Coordinator to assist in daily implementation of recovery plan. Establish expanded Operations Groups in all known regularly used sites. Collaborate closely with the Swift Parrot Recovery Team.
2	Maintain and enhance habitat.	Four Operations Groups successfully implementing their regional work plans by December 1999. Part-time facilitators successfully working towards recovery plan goals. Information package widely used in landuse planning.	Develop generic guidelines for content of regional work plans. Prepare regional work plans for the key regions. Assist Operations Groups to obtain funding to appoint part-time facilitators. Develop an information package on habitat requirements and guidelines for habitat management. Ensure habitat management guidelines are reflected in Regional ecosystem management plans. Identify patches of significant habitat and promote habitat management guidelines to relevant land managers and agency staff.

3	Monitor trends in population size and range.	←	←	After five years a statistically valid measure of population trends achieved.	↑	←	Develop and implement a sampling regime at the three major regions which will allow comparisons of annual population indices.
		↑			↑		
		↑			↑		
		↑			↑		
		↑			↑		
		↑			↑		
		↑			↑	←	Obtain an annual estimate of recruitment by measuring the proportion of immature birds, and sex ratios, in pre-breeding flocks at the three major breeding regions.
		↑			↑		
		↑			↑		
		↑			↑		
		↑			↑		
		↑			↑		
		↑	←	Identification of regions where range continues to contract.	←	←	Analyse existing sightings database to identify potential range contraction. Contribute to new Birds Australia 'Atlas of Australian Birds' project. Conduct on-going comparisons of the new atlas database, recovery team sightings database and 1977-1981 RAOU Atlas.
4	Facilitate strategic research	←	←	Identification of areas and habitats used during non-breeding periods by birds from the three main breeding areas.	←	←	Conduct pilot radio telemetry study at Chiltern. If successful, repeat in the following two summers and initiate similar studies at Bundarra-Barraba and Capertee Valley.
		↑					
		↑					
		↑					
		↑					
		↑					
		↑					
		↑	←	After five years a level of understanding on population isolation which allows sensible management decisions.	←	←	Continue to assess the degree of isolation between populations by colour-banding and on-going searches for colour-banded birds.
		↑					
		↑					
		↑					
		↑					
		↑					
		↑	←	Response of Regent Honeyeaters monitored at a minimum of four pairs of removal and control sites.	←	←	Conduct removal experiments to determine whether Noisy Miners limit habitat availability and use.
		↑					
		↑					
		↑					
		↑					
		↑	←	Understanding of the applicability to Victoria of management decisions based on data from northern NSW.	←	←	Collect data on resource use by at least 10 pairs of Regent Honeyeaters in north-eastern Victoria and compare with existing data from northern NSW.
		↑					
5	Maintain and increase community awareness, understanding and involvement.	←	←	Increasing community participation in recovery effort, particularly as members of Operations Groups.	←	←	Use all forms of mass media and local media to inform general community of recovery effort and its achievements.
					↑		
					↑		
					↑		
					↑		
					↑	←	Produce a semi-annual newsletter to inform participants and interest groups of progress.
					↑		
					↑		
					↑		
					↑	←	State agency staff and Operations Groups to promote appropriate management of significant habitat patches.
					↑		
					↑		
					↑		
					↑		Establish a Regent Honeyeater exhibit at Taronga Zoo.
					↑	←	
					↑		Actively pursue corporate sponsorship of Active Management actions
					↑		
					↑	←	
					↑		



RECOVERY ACTIONS

A coordinated program of habitat protection and enhancement across the entire range of the species will be the corner-stone of the recovery effort. This program will be refined as the results of monitoring and ecological research become available.

1. Organisational Arrangements

1.1 Continue to use the Recovery Team to guide, evaluate and review progress, and implement recommendations which flow from the research outlined below. The Recovery Team will, within two years of acceptance of this recovery plan, re-evaluate the adequacy of the actions proposed in this plan.

Explanation: Given the complex, multi-disciplinary nature of the recovery effort, and the number of individuals and organisations involved, a coordinating body is essential to oversee and assist implementation of this plan, to review progress and to advise on refinements to the plan.

The Recovery Team will include representatives of:

Environment Australia, Threatened Species and Communities Section
NRE Flora and Fauna Branch
NRE North East Area
NSW National Parks and Wildlife Service
NSW Department of Land and Water Conservation
Greening Australia
Birds Australia
Bundarra-Barraba Operations Group
Capertee Valley Operations Group
Central Coast Operations Group
North-east Victoria Operations Group
Zoological Parks Board of New South Wales
La Trobe University School of Zoology
University of New England Division of Zoology
World Wide Fund for Nature

Responsibility: Government agencies will meet any costs associated with attendance of their representatives at Recovery Team meetings. In cases where NGO or university representatives face considerable expense to attend a meeting consideration will be given to reimbursement of fares and other valid costs from the recovery effort budget.

1.2 Share the workload and costs of program management more equitably between the two main State agencies - Flora and Fauna Program of NRE in Victoria and National Parks and Wildlife Service in NSW. In particular, NPWS should take the lead role in managing this recovery effort, including employment of the coordinator. Greater involvement of the wildlife agencies of Queensland and ACT is also desirable.

Explanation: For the first five years of this recovery effort program management was entirely undertaken and funded by the Victorian Government through the Flora and Fauna Branch of NRE. Since most of the Regent Honeyeater population resides in NSW and the most urgent habitat management issues are in that State, it is imperative to obtain a greater contribution from the NSW Government towards the implementation of this plan.

Responsibility: NSW NPWS and NRE Flora and Fauna Program.

Costs of actions 1.1 and 1.2 ($ x 1000) are:

YEAR	1999	2000	2001	2002	2003	TOTAL
COST	49.8	50.0	51.2	51.4	52.6	255.0

1.3 Appoint a full-time Coordinator to help with all aspects of implementation of this plan, including liaison with all appropriate government agencies, LandCare groups, bird study organisations and other NGOs. The Coordinator is best located in the same building as the project leader.

Explanation: The coordinator will have a particularly important role in implementing tasks 1.4, 2.1 – 2.4, 3.3 and 4.1-4.4, 5.1, 5.2.

Responsibility: The position reports directly to the Project Leader.

Costs of action 1.3 ($ x 1000) are:

YEAR	1999	2000	2001	2002	2003	TOTAL
COST	66.6	62	63.4	63.6	65.0	320.6

1.4 In the vicinity of known regularly-used sites establish expanded ‘Operations Groups’ to assist with implementation of regional work plans, local monitoring, survey and extension tasks. NRE and NSW NPWS will take a greater role in facilitating and supporting the work of Operations Groups.

Explanation: The expanded Operations Groups are alliances of volunteer members of the public and professionals in the conservation and land management fields. Their primary focus is to facilitate the improved management of habitat for the Regent Honeyeater and to monitor populations in their area. Their activities reflect the priorities of the recovery plan and are coordinated by the Recovery Team through the Regent Honeyeater Coordinator. They will have a central role in the implementation of the regional work plans.

Responsibility: NSW NPWS and NRE Flora and Fauna Program.

Costs of action 1.4 ($ x 1000) are:

YEAR	1999	2000	2001	2002	2003	TOTAL
COST	12.5	12.6	12.9	14	14.5	66.5

1.5 Liaise closely with the Swift Parrot Recovery Team to maximise synergies arising from the ecological similarities between these two species.

Explanation: Given the close overlap in range and habitat usage of these two species, there are likely to be numerous benefits in a close working relationship between the two Recovery Teams to pursue joint goals.

Responsibility: Recovery Team and Coordinator.

Costs of action 1.5 ($ x 1000) are:

YEAR	1999	2000	2001	2002	2003	TOTAL
COST	1.5	1.5	1.5	1.5	1.5	7.5

1.6 Establish a scientific subcommittee to advise the recovery team on priorities, opportunities and methodologies for meeting the research actions outlined in this plan. The subcommittee will comprise the two academics on the recovery team, the chairperson, coordinator and any researchers that the subcommittee wishes to co-opt.

Explanation: The recovery team must ensure that maximum benefit for the recovery effort is derived from any research it funds. Design and supervision of research is a specialist task which is beyond the expertise of a majority of recovery team members. Further, time at regular recovery team meetings is usually inadequate to give the level of attention required to develop research plans and data analysis protocols. Therefore, a specialist group is necessary.

Responsibility: Project leader and Coordinator.

Costs of Action 1.6 ($ x 1000) are:

YEAR	1999	2000	2001	2002	2003	TOTAL
COST	3.0	3.0	3.0	3.0	3.0	15.0

2. Active Management

A. IN THE REGULARLY-USED REGIONS

2.1 In the four key regions (Bundarra-Barraba, Capertee Valley, Central Coast and north-eastern Victoria) prepare regional work plans to be implemented by the expanded Operations Groups.

Explanation: To ensure that their work is clearly focussed on the priority tasks, Operations Groups would be assisted by having a plan of action specifically for their local area. In conjunction with the Recovery Team, each group will develop a concise plan based on guidelines developed by the team. The plans will list, in priority order, the tasks to be implemented each year. These will include actions to identify, rank and map key habitat patches, identify key land managers and establish working relationships to facilitate appropriate management changes. Monitoring of population numbers and recruitment, using methods defined by the Recovery Team, will also be a priority action for Operations Groups (see Action 3).

Responsibility: Joint effort of the State agencies, Operations Groups and coordinator.

Costs of action 2.1 ($ x 1000) are:

YEAR	1999	2000	2001	2002	2003	TOTAL
COST	6.7	6.3				13.0

2.2 Employ part-time Community Recovery Facilitators to assist four Operations Groups.

Explanation: Until now, Operations Groups have comprised interested volunteers. They have proved to be a very effective method of achieving population monitoring, community awareness and some habitat enhancement. However, membership has largely been restricted to bird enthusiasts who have had to struggle to influence land managers. It is now timely to expand the role and composition of Operations Groups to achieve much greater involvement of land managers and local and State government, as well as voluntary members of the public. This expanded role

will be beyond the resources of an entirely voluntary group; groups assisted by a paid facilitator are far more likely to succeed.

Responsibility: Project leader chair and Coordinator

Costs of action 2.2 ($ x 1000) are:

YEAR	1999	2000	2001	2002	2003	TOTAL
COST	112	112	116	116	116	572

2.3 Ensure that regional ecosystem management processes take adequate account of relevant guidelines and recommendations for management of the Regent Honeyeater. Such processes include: best practice guidelines for freehold land; NSW Environmental Impact Assessment process; NSW Regional Vegetation Plans under the Native Vegetation Act 1997; Victorian Catchment Management Plans; Victorian Biodiversity Regional Networks and Plans; Forest Management Area plans and prescriptions and Municipal Planning Scheme reviews.

Explanation: In both Victoria and NSW there are currently a number of regional ecosystem management plans being developed. Thus, it is opportune to ensure that the needs of the Regent Honeyeater are given due consideration in these plans.

Responsibility: State agency representatives, Coordinator and Operations Groups.

Costs of action 2.3 ($ x 100) are:

YEAR	1999	2000	2001	2002	2003	TOTAL
COST	19.2	19.2	19.2	17	17	91.6

B. THROUGHOUT THE FORMER RANGE

2.4 Develop an information package on habitat requirements and guidelines for habitat management to be promoted to relevant land managers and decision makers throughout the former range of the species. State agency staff and Operations Groups will promote the guidelines to relevant land managers and agency staff and ensure that patches of suitable habitat are identified and mapped on relevant planning tools

Explanation: Regent Honeyeaters opportunistically utilise patches of habitat. Therefore, it is essential to maintain adequate patches of suitable habitat to provide for the needs of the species under all contingencies of climate and land use. Our understanding of the ecological requirements of the Regent Honeyeater is now sufficient to provide some key guidelines for land managers on a broad scale.

Responsibility: Recovery Team and Coordinator.

Costs of action 2.4 ($ x 1000) are:

YEAR	1999	2000	2001	2002	2003	TOTAL
COST	2					2

3. Monitoring

A MONITORING POPULATION LEVELS

3.1 Develop and implement a sampling regime at the three major Regent Honeyeater breeding regions (Barraba-Bundarra, Capertee Valley, Chiltern) which will allow comparisons of annual population indices.

Explanation: To gain a better understanding of the population status of the Regent Honeyeater it is essential to establish a program of standardised population counts at the regularly-used sites. With input from a specialist in population modelling, information collected during the first phase of this recovery effort could be used to develop a sampling regime to allow meaningful comparisons of

population trends over time and between sites. It is likely that the sampling regime will involve up to 10 walked transects at the three main regions to be conducted three times per year, with at least one simultaneous count at all three regions. The monitoring will be conducted by the Operations Groups and results will be reported annually to the Recovery Team.

Responsibility: Scientific sub-committee and Operations Groups.

Costs of action 3.1 ($ x 1000) are:

YEAR	1999	2000	2001	2002	2003	TOTAL
COST	15.5	10.5	10.5	10.5	10.5	57.5

3.2 Obtain an annual estimate of recruitment to the population by capturing a sample of birds in communal roosts and determining the proportion of first-year birds by plumage characteristics. Colour-band all birds handled to increase knowledge of survivorship and movement patterns.

Explanation: Monitoring of nesting success is very labour-intensive and thus very costly. Furthermore, it does not provide any information on survival rates after fledging. The recent discovery of communal roosting behaviour in pre-breeding flocks at Capertee Valley (D. Geering unpublished) and in winter flocks at Howes Valley, Warrumbungle National Park and Chiltern National Park (Oliver 1998a) suggests that it may be possible to capture a sample of pre-breeding or winter flocks to determine the age and sex structure of the flocks (by plumage characters and morphometrics). This will provide a cost-effective annual index of recruitment at each site, essential information for meaningful population viability analysis.

Responsibility: Scientific sub-committee and Operations Groups.

Costs of action 3.2 ($ x 1000) are:

YEAR	1999	2000	2001	2002	2003	TOTAL
COST	16.0	16.0	16.0	16.0	16.0	80.0

B MONITORING CHANGES IN DISTRIBUTION

3.3 Analyse existing sightings database to identify areas from which Regent Honeyeaters may have contracted during the last decade. Continue to collate data about sightings of Regent Honeyeaters whenever possible. Conduct on-going comparisons of data in the new ‘Atlas of Australian Birds’ database, Recovery Team sightings database and 1977-1981 RAOU Atlas.

Explanation: It is essential to understand whether the drastic range contraction which occurred during the 1940s-1960s is continuing. For such a widespread and mobile species this can only be achieved by enlisting the support of bird observers from throughout eastern Australia. The Atlas of Australian Birds project can achieve this more effectively than the Recovery Team and will provide a timely service to this project. Comparisons between the three data sets should prove to be highly informative.

Responsibility: Recovery Team and Coordinator.

Costs of action 3.3 ($ x 1000) are:

YEAR	1999	2000	2001	2002	2003	TOTAL
COST	16	4	4	4	4	32

4. Research

4.1 In November-December 1999 conduct pilot radio-tracking study of post-breeding movements at Chiltern. If successful, repeat in the following two summers and initiate similar studies at Bundarra-Barraba and Capertee Valley. Collect data on habitat and resource use at any new sites to be conveyed to relevant land managers.

Explanation: A major gap in existing knowledge on which to base management of the Regent Honeyeater is the whereabouts of birds after they leave their breeding sites in late summer. It is essential to understand movement patterns after breeding so that the security of important habitats and sites can be assessed and improved where necessary. Radio-tracking is potentially the most efficient means of gathering this information because the chances of resighting colour-banded birds away from the well-known sites are remote.

Responsibility: Coordinator or contractor.

Costs of action 4.1 ($ x 1000) are:

YEAR	1999	2000	2001	2002	2003	TOTAL
COST		50		50		100

4.2 Continue to assess the degree of isolation between populations breeding in the Barraba-Bundarra, Capertee Valley and north-east Victoria regions. This is best achieved by capturing and colour-banding birds whenever possible, including an annual sample of birds (at least 20) captured for Action 3.2, and on-going searches for colour-banded birds at the three main sites, for example while carrying out Action 3.1.

Explanation: Information from DNA and morphometric studies suggests that there has been little partitioning within the Regent Honeyeater population in recent evolutionary time. However, habitat fragmentation during the past 150 years may have led to population fragmentation which is yet to be reflected in DNA or morphological studies. Such information is important for determining management strategies at the regional scale.

Responsibility: Operations Groups.

Costs of action 4.2 ($ x 1000) are:

YEAR	1999	2000	2001	2002	2003	TOTAL
COST	7	7	7	7	7	35

4.3 Conduct removal experiments to determine whether Noisy Miners limit habitat availability and use by Regent Honeyeaters. This could take the form of removing Noisy Miners from four sites adjacent to Regent Honeyeaters and comparing the behaviour and residency period of the honeyeaters with those at control sites from which no miners have been removed.

Explanation: Recent studies (Clarke et al 1995, Grey et al 1997) indicate that populations of the Noisy Miner can greatly reduce access to resources for other bird species. Noisy Miners are apparently advantaged by vegetation fragmentation and simplification, processes that have affected many areas utilised by Regent Honeyeaters, and thus may be a factor in the decline of the Regent Honeyeater.

Responsibility: Contractor.

Costs of action 4.3 ($ x 1000) are:

YEAR	1999	2000	2001	2002	2003	TOTAL
COST		20	20	11		51

4.4 Collect data on resource use by at least 10 pairs of Regent Honeyeaters in north-eastern Victoria and compare with existing data from northern NSW. Report findings to Recovery Team.

Explanation: Considerable information has been gleaned on habitat utilisation by Regent Honeyeaters in northern NSW through a PhD study and research by members of the Bundarra-Barraba Operations Group. This information has allowed the development of useful habitat management prescriptions for the area. In contrast, there has been no systematic study of resource use in southern parts of the range, and consequently our ability to accurately plan for habitat conservation is poorer. A good indication of the level of differences in habitat utilisation could be gained by an initial BSc Honours study.

Responsibility: Contractor

Costs of action 4.4 ($ x 1000) are:

YEAR	1999	2000	2001	2002	2003	TOTAL
COST		5				5

5. Community Participation and Awareness

It is essential that government agencies effectively communicate and coordinate in the implementation of this plan, and effectively communicate with researchers and client groups. Equally importantly, interest groups and the public must be kept informed of the problems facing the Regent Honeyeater, actions being taken under this plan, and progress and achievements. Interest groups and interested individuals should have the opportunity to participate in the recovery effort where practicable and workshops or field days may be appropriate to train potential contributors.

Liaison with land managers will be undertaken at several different levels; by agency extension officers, the Coordinator and by Operations Groups. Where appropriate this liaison should involve the development of informal partnerships with the land managers, such as those under the Victorian Land for Wildlife Scheme.

5.1 The general community will be kept aware of the recovery effort, its achievements and the key role being played by community groups and volunteers, through all forms of mass media and local regional media.

Explanation: Because the Regent Honeyeater is so widespread and much of its habitat occurs on private land, widespread community support is essential to the success of this recovery effort. Opportunities for publicity on local newspapers, radio or television should always be grasped. Articles in wildlife or environmental magazines and journals are also a valuable means of increasing support and awareness amongst the committed public.

Responsibility: Recovery Team and Coordinator.

Costs of action 5.1 ($ x 1000) are:

YEAR	1999	2000	2001	2002	2003	TOTAL
COST	16	16	16	16	16	80

5.2 Interest groups and participants will be kept informed of developments via a twice-yearly newsletter compiled by the Coordinator.

Explanation: Feedback is essential to the maintenance of enthusiasm and commitment amongst all contributors. A regular newsletter is a cost-effective means of informing interested people of progress, developments and priorities for further work, and helps all contributors to place their work into context of the wider recovery effort.

Responsibility: Recovery Team and Coordinator.

Costs of action 5.2 ($ x 1000) are:

YEAR	1999	2000	2001	2002	2003	TOTAL
COST	2	2	2	3	3	12

5.3 On a local level, numerous government and community groups will need to be kept informed of significant habitat patches and the appropriate management of them. Such groups include shire planners, fire fighting organisations, utility providers and landholders. This level of extension must be carried out by regional staff of the State Government land management agencies, reinforced, where appropriate, by the Operations Groups or other NGOs. In NSW this can be best achieved through identification of significant habitat patches in Regional Vegetation Plans.

Explanation: Because Regent Honeyeater habitat occurs on a wide variety of land tenures a large range of organisations and individuals have the capacity to affect its quality and extent, both positively and negatively. All such people need to be appraised of the impact that their actions may have on the Regent Honeyeater or its habitat, and of their obligations under various State and National legislation and policies.

Responsibility: Recovery Team, Operations Groups and Coordinator.

Costs of action 5.3 ($ x 1000) are:

YEAR	1999	2000	2001	2002	2003	TOTAL
COST	26	26	26	30	30	138

5.4 Establish a Regent Honeyeater exhibit at Taronga Zoo depicting a group of Regent Honeyeaters in their natural habitat and incorporating details of the natural history of the species and information on all aspects of the recovery effort.

Explanation: Given that Regent Honeyeaters are now established in captivity there exists an excellent opportunity to gain exposure to very large numbers of people who visit Taronga Zoo. Management of the zoo are keen to establish a display of the species to further their contribution to the recovery effort and to promote the role of zoos in threatened species management. This service will be provided at no direct cost to the recovery effort.

Responsibility: Taronga Zoo

Costs of action 5.4 ($ x 1000) are:

YEAR	1999	2000	2001	2002	2003	TOTAL
COST	3	5	4	4	4	20

5.5 Actively pursue corporate sponsorship of Active Management actions (see under 2 above).

Explanation: Some of the local management actions have potential for sponsorship by local businesses and these should be pursued by agency staff and Operations Groups whenever possible.

Responsibility: Recovery Team and Coordinator.

Costs of action 5.5 ($ x 1000) are:

YEAR	1999	2000	2001	2002	2003	TOTAL
COST	6	6	6	6	6	30

6. Captive Management

Although the recovery effort is predicated on effective management of the wild population, there are significant advantages in having a captive population at this stage in the recovery effort. These include: a longer lead time in which to develop techniques of captive husbandry and intensive manipulation, including captive release, to be deployed should the wild population continue to decline; opportunities to collect detailed breeding observations and data which are difficult to obtain in the wild; opportunities to trial research techniques such as the attachment of radio transmitters and colour-marking methods; and opportunities for community education.

6.1 Maintain a viable captive population for at least the duration of this recovery effort. This population will provide insurance against the demise of the wild population as well as producing adequate numbers of birds to meet the other objectives of this plan. Include at least two other ARAZPA institutions in cooperative management of the species.

Explanation: During implementation of the first recovery plan, techniques of captive management of the Regent Honeyeater were developed and a draft husbandry manual was prepared (Barker 1997). It is now practicable to maintain the species in captivity on a long-term basis and to use the

captive birds to benefit the recovery effort in several ways. It is too early to put a sensible figure on the size of captive population required to meet the needs of the recovery effort.

Responsibility: Taronga Zoo

Costs of action 61 ($ x 1000) are:

YEAR	1999	2000	2001	2002	2003	TOTAL
COST	15	15	15	15	15	75

6.2 Produce a captive management plan following ARAZPA procedures. This will include the maintenance of heterozygosity in the captive colony at a level of 90% of that of the wild population.

Explanation: For long-term captive breeding a target of 90% of wild heterozygosity after 200 years is generally used (Ralls & Ballou 1986). Costings include time required to obtain samples from the wild population, maintenance of the ISIS studbook by Taronga Zoo and laboratory costs.

Responsibility: Taronga Zoo

Costs of action 6.2 ($ x 1000) are:

YEAR	1999	2000	2001	2002	2003	TOTAL
COST	4.3			2		6.3

6.3 Produce a final draft of the Regent Honeyeater Husbandry Manual

Explanation: Preparation of a husbandry manual for the Regent Honeyeater was an action under the first recovery plan which is close to completion (Barker 1997), an outstanding achievement in only three years.

Responsibility: Taronga Zoo

Costs of action 6.3 ($ x 1000) are:

YEAR	1999	2000	2001	2002	2003	TOTAL
COST		2				2

6.4 Undertake trials of hard-release techniques involving 4 - 6 radio-tagged birds. If the birds survive for the duration of transmitter life, actively search for them for the following two years.

Explanation: Although there is currently no role perceived for release of captive-bred birds in the management of the Regent Honeyeater, it would be wise to undertake trials of release strategies in advance. If current rates of breeding in captivity are maintained, surplus birds will be available during 1999. These trials would also be of benefit to other recovery efforts for Australian birds such as the Black-eared Miner and Helmeted Honeyeater.

Responsibility: Taronga Zoo and Recovery Team.

Costs of action 6.4 ($ x 1000) are:

YEAR	1999	2000	2001	2002	2003	TOTAL
COST		19	12	12		43

6.5 Develop an aging and sexing guide for use by field ornithologists

Explanation: Managers of captive colonies have the capacity to make detailed measurements of growth rates and morphological changes with age. Such data can prove to be extremely useful for field researchers and wildlife managers and opportunities to collate such information should always be grasped.

Responsibility: Coordinator and Taronga Zoo

Costs of action 6.5 are: no cost.

6.6 Complete the trials of harness attachment techniques for radio transmitters which were commenced during 1997. Publish the results of the trials.

Responsibility: Taronga Zoo and Natasha Schedvin.

Costs of action 6.6 ($ x 1000) are:

YEAR	1999	2000	2001	2002	2003	TOTAL
COST		6				6

7. Review of Progress

The Recovery Team will conduct biannual reviews to assess progress towards implementation of the recovery plan. Each review will be conducted by the Recovery Team with one or two external people asked to provide constructive and critical input. At the review, personnel responsible for each component of this plan will present a progress report. The review should ensure that successes and failures in implementation are identified, and a process to overcome any failures is agreed to and documented. Thus, the review will be a starting point for detailed planning of actions for the following two years.

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