Muir's Corella management

Wildlife management program no.61

Department of Parks and Wildlife

2015

Department of
Parks and Wildlife

Department of Parks and Wildlife
Locked Bag 104
Bentley Delivery Centre WA 6983
Phone: (08) 9219 9000
Fax: (08) 9334 0498

www.dpaw.wa.gov.au

December 2015

Front cover images: Muir's Corellas.
Photos by Tony Kirkby and Eve Parry.

FOREWORD

This wildlife management program has been prepared within the framework laid down in Department of Parks and Wildlife Policy Statement no. 44 (CALM 1992), which provides for the preparation of written wildlife management programs to guide the management and protection of any taxon, or group of taxa, and their habitats. Wildlife management programs may be prepared for threatened taxon or taxa that are subject to harvesting or other exploitation through human interaction.

Information in this wildlife management program was accurate at June 2015. This wildlife management program will remain in force until withdrawn or replaced. Modification to the management actions identified in this wildlife management program may be endorsed by the Department where new information justifies such modifications.

Wildlife Management Program Preparation: This Wildlife Management Program was prepared by Brad Barton, Regional Leader Nature Conservation and SFM, Department of Parks and Wildlife Warren Region with assistance from Ken Atkins, Manager Species and Communities Branch, Department of Parks and Wildlife.

Citation: Department of Parks and Wildlife (2015). Muir's Corella management. Wildlife Management Program No 61. Department of Parks and Wildlife, Perth, Western Australia.

CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
IUCN	International Union for Conservation of Nature
MoU	Memorandum of Understanding
WC Act	*Wildlife Conservation Act 1950*
BAM Act	*Biosecurity and Agricultural Management Act 2007*

EXECUTIVE SUMMARY

Muir's corella, one of four corella species in the southern part of Western Australia, once inhabited most of the south-west of Western Australia from the Swan and Avon Rivers south to Broomehill and Augusta. The species now has a restricted distribution of approximately 12,000km^2 in the Tone Bridge, Rocky Gully, Frankland River and Lake Muir area in parts of the Warren, South West and Wheatbelt Regions of the Department of Parks and Wildlife. The birds historically formed flocks numbering in their thousands, causing significant damage to grain crops. They were consequently regarded as pest birds and actively controlled by primary producers resulting in a drastic reduction in the population size in the mid 1900s, to the extent that they were deemed to be at risk of extinction. They were listed as threatened fauna under the *Wildlife Conservation Act 1950* in 1990.

With the protection afforded through their listing as threatened fauna, Muir's corella has recovered from a population as low as 100 birds in the 1940s to over 20,000 birds in 2014. They are again forming significant flocks numbering in their thousands during the summer months where they descend on grain crops and into towns seeking food resources. They cause significant damage to standing cereal crops, compete with stock for grain that is fed during the summer and are also destructive in town environments where they chew coaxial cables, artificial turf cricket pitches and bowling greens, and cause considerable damage to gardens and lawns.

In the autumn months after opening rains, the birds will feed on and can destroy freshly sown and newly germinating grain crops, to the extent that the crops have to be re-sown or abandoned. Flocks of up to 3000 birds have been recorded by some farmers feeding on freshly sown oat and barley crops.

Corellas by nature are gregarious, loud birds and when roosting or feeding in their hundreds or thousands create a considerable amount of noise from dusk to dawn each day, a nuisance by damaging infrastructure such as wiring and water pipes and compete for and consume a significant amount of grain. This behaviour has a significant socio-economic impact on the farming and town communities where Muir's corella lives.

Such has been its recovery that the species was removed from the Western Australian threatened species list on 6 November 2012. Muir's corella does, however, remain specially protected by the Wildlife Conservation Act, being listed as "other specially protected fauna", and through the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) where it is currently listed as vulnerable. Alignment of the state and national listings will be pursued as per the Memorandum of Understanding between the State of Western Australia and the Commonwealth of Australia.

Once there is alignment of the birds' conservation status between the Commonwealth and the State, there is likely to be interest from stakeholders impacted by Muir's corella to seek a damage permit to not only disturb or scare the birds but to also destroy birds where there is significant impact on their farming enterprise and/or lifestyle. This creates some significant challenges for Parks and Wildlife managers to meet the expectation of the community to control the birds as they are regarded as a pest, yet not to decrease or impact on the bird's population to such an extent it again meets the criteria for listing as a threatened species.

This Wildlife Management Program considers and identifies the actions needed to meet the community demands for management of the birds and for the continued conservation of the species.

1 TAXONOMY AND RELATIONSHIPS

Muir's corella *Cacatua pastinator pastinator* is one of the two sub-species of western long-billed corella (Higgins 1999) in Western Australia. The second sub-species is Butler's corella *Cacatua pastinator butleri.* The two sub-species are geographically isolated with Butler's corella occurring in the northern wheatbelt of WA extending south to Wagin, and Muir's corella confined to the south-west corner of WA near Lake Muir (Figure 1) (Johnstone and Storr 1998; Higgins 1999). Muir's corella can be confused with the little corella *C. sanguinea*, however Muir's corella is larger, has a longer upper mandible, has orange-red lores and more intense yellow on underparts of its wings and tail than the little corella (Higgins 1999).

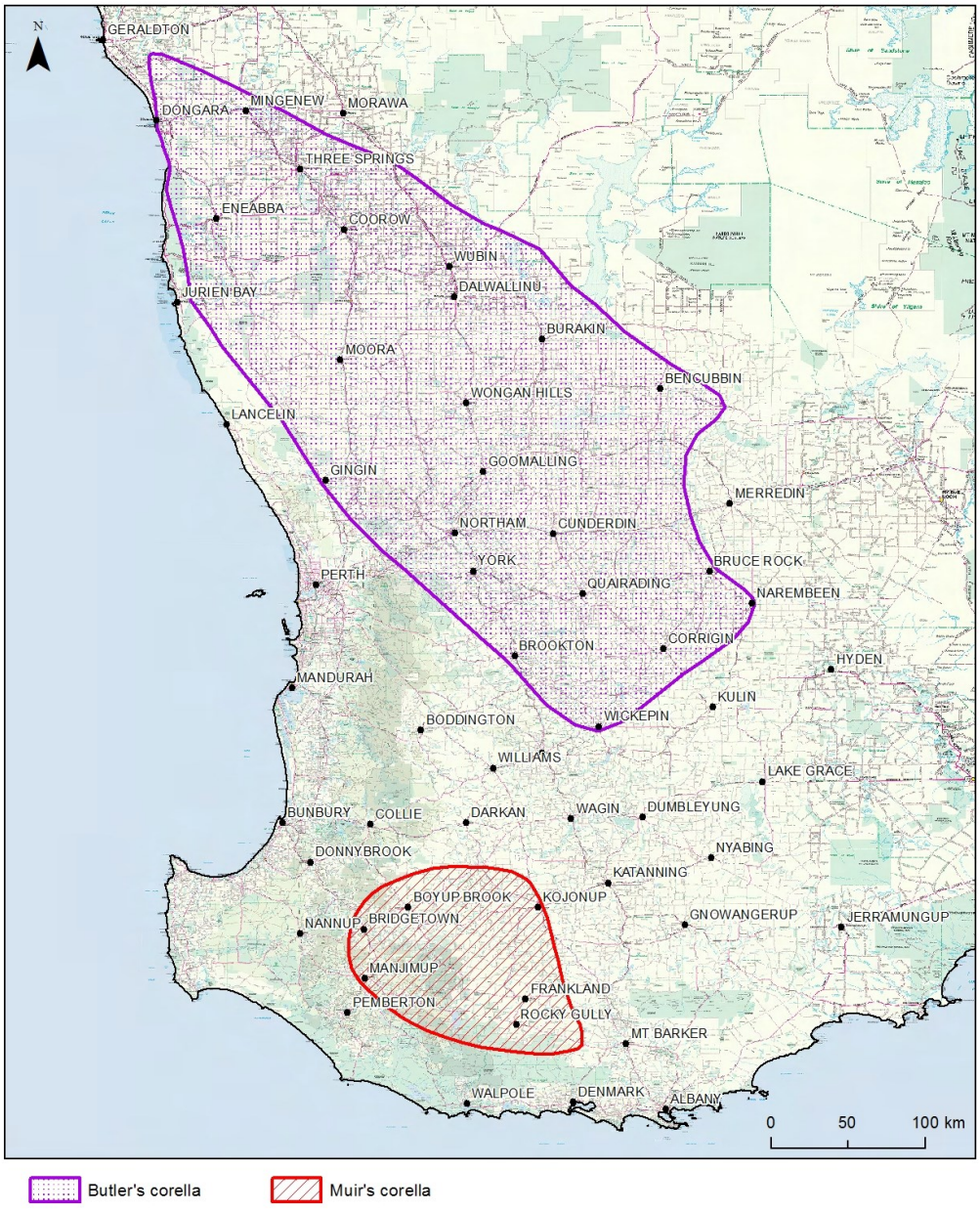

Figure 1: Distribution of Muir's corella and Butler's corella (R. Johnstone pers. comm. 2015)

2 MUIR'S CORELLA HABITATS

2.1 Diet

Muir's corella feeds on a wide variety of corms, tubers and seeds from both introduced and native plant species, and insect larvae (Higgins 1999). Its long bill is efficient for digging corms and tubers from the ground and it will dig up newly planted and germinating grain crops such as wheat, oats and barley (Higgins 1999). It also feeds on grain amongst stubble and in cattle and sheep feed-lots (Higgins 1999). The species is also known to compete with stock for oats, wheat and barley laid as trails on the surface of paddocks during the summer months, and they have been recorded "cutting" down standing oat crops prior to harvesting to gain access to the ripening seed (B. Barton personal communication). Muir's corella has also been reported causing damage to horticulture crops, such as cabbages and pumpkins, and tree seedlings in revegetation areas (B. Barton personal communication).

Muir's corella predominantly eat corms of the introduced 'Guildford grass' or 'onion grass' *Romulea rosea* (Smith and Moore 1991). Other introduced plant species eaten by Muir's corella included *Erodium* spp., tubers of nut grass *Cyperus rotundus*, clover *Trifolium* spp. and curled dock *Rumex crispus* (Smith and Moore 1991). The native plant species eaten by Muir's corella include the bulbs of sundews *Drosera* spp. (Carter 1912), the roots of 'orchidaceous plants' (Serventy and Whittell 1976) and the seeds of marri *Corymbia calophylla* and spear grass *Stipa* spp. (Smith and Moore 1991).

2.2 Movement

Strongly gregarious, Muir's corella forages and roosts in small groups or flocks of hundreds of individuals (Higgins 1999). These flocks are widely distributed, probably because of the patchy distribution of suitable habitat within their range (Smith 1982). During the breeding season, the nest tree is the focus of activity, and feeding takes place nearby (Higgins 1999). After fledging, the young and their parents are joined by other family groups and immature birds (Higgins 1999). These flocks may then disperse to suitable summer feeding sites. These summer flocks may be comprised of flocks from a number of breeding districts (Smith and Moore 1992), sometimes forming flocks of up to 1000 individuals (Johnstone and Storr 1998). Breeding adults return to their breeding district at the end of summer (Higgins 1999). Immature birds form locally nomadic flocks that may return to their natal area or remain in the summer feeding district (Smith and Moore 1992).

2.3 Reproduction

The breeding biology of Muir's corella has been studied by Ron Johnstone, Curator of Birds at the Western Australian Museum. Most of the known nests are located in lone trees in paddocks or along roadsides and in remnant wood lots on farms (R. Johnstone personal communication). The breeding habitat occurs on private property, particularly near Rocky Gully, Lake Muir and Tonebridge/Mordalup (R. Johnstone personal communication). Eggs are laid from September to November and the clutch size ranges from one to four eggs (Johnstone and Storr 1998, G. Smith unpublished data). The incubation period is 26 to 29 days (Johnstone and Storr 1998). For nests of Muir's corella monitored near Unicup in 1977, mean clutch size was three and the mean number fledged was 0.9 per nest (*n* = 9 nests, G. Smith unpublished data). Anecdotal reports from farmers and landholders in the Tonebridge area in 2014 are that the corellas are now successfully raising up to three chicks per year (B. Barton personal communication).

Survival rates of adult and immature Muir's corellas are unknown, but factors known to cause mortality, particularly of immature birds, include predation by falcons *Falco* spp. (Smith and Rowley 1995) or other birds of prey, road deaths and shooting or poisoning by humans (Garnett and Crowley 2000). Longevity for captive *C. pastinator* subspecies is up to 26 years (Brouwer *et al.* 2000) and a specimen of *C. p. butleri* tagged by G. Smith in 1977 was at least 25 years old when it was shot as part of a culling program in 2001 (Rowley and Mawson 2001).

3 LEGISLATION

3.1 Wildlife Conservation Act 1950

Muir's corella was listed on 16 November 1990 on the Wildlife Conservation (Specially Protected Fauna) Notice 1990 under Schedule 1 'fauna that is rare or is likely to become extinct', i.e. as threatened fauna. On 6 November 2012, Muir's corella was removed from the WA threatened species list and transferred under the Wildlife Conservation (Specially Protected Fauna) Notice 2012(2) to Schedule 4 'Other specially protected fauna'. This classification provides the same level of special protection as threatened fauna under the Wildlife Conservation Act.

The transfer of Muir's corella from Schedule 1 to Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice was on the basis of the recovery of the species to over 1000 mature individuals (or over 1000 breeding pairs) and no observed decline, as per the International Union for the Conservation of nature (IUCN) threatened species criteria. The population estimate in 2011 was 16,000 birds, with potentially 40 per cent (6,400) being mature breeding birds. Under the IUCN criteria for threatened species, should any decline occur in the population, a population of over 10,000 mature individuals is required to maintain a non-threatened status.

On 3 November 2015, Muir's corella was transferred under the Wildlife Conservation (Specially Protected Fauna) Notice 2015 to a new category of Other specially protected fauna: Schedule 6 'Fauna that is of special conservation need as conservation dependent fauna'. Conservation dependent fauna are those species that are deemed to be not threatened, but are dependent on ongoing conservation intervention, such as through a specific conservation program.

3.2 Environment Protection and Biodiversity Conservation Act 1999

Muir's corella is listed as Vulnerable under Section 178 of the EPBC Act.

3.3 Biosecurity and Agriculture Management Act 2007

Muir's corella is listed on the Western Australian Organism List under the *Biosecurity and Agriculture Management Act 2007* (BAM Act) as a Declared Pest (Category C3 – management), in the Shires of Boyup Brook, Cranbrook and Manjimup. The BAM Act is administered by the Western Australian Department of Agriculture and Food, and has replaced the *Agriculture and Related Resources Protection Act 1976*.

Category C3 means that a management programme outlines the area and conditions under which controls may be applied. This wildlife management plan will act as a management programme for the purposes of the BAM Act

4 POTENTIAL CONFLICT

It is well documented that Muir's corella damages newly sown grain crops, horticultural crops, seedling trees in plantations, home gardens, television aerials, water piping and power lines. In 2011, the birds were recorded chewing artificial turf bowling greens and cricket pitches as well as digging up grassed ovals in the Frankland River townsite. In large flocks over summer they consume stock feed and cause excessive noise around rural households and townsites. It was these behaviours that led to the birds being poisoned and shot to such an extent that only approximately 100 birds remained in the 1940s.

Now that the population is around 20,000 and the birds' behaviour has not altered, there is again conflict between the conservation of the species and the lifestyle and farming businesses in the area the birds reside. With changing agricultural practices away from cattle and towards cereal grain crops and sheep across the birds' general range, the potential for conflict is compounded.

It has also been reported by members of the community that they have observed Muir's corella, with their aggressive nature to other bird species, take over nest sites of other hollow nesting birds.

5 THREATS

Introduced corellas, feral honey bees, loss of habitat through clearing, lack of recruitment of future habitat trees and salinity are continuing threats to this species, and other native wildlife, which need to continue to be managed. Unregulated population control for damage mitigation is a further potential threat that must also be managed to ensure the conservation of this species. An integrated management approach is necessary to achieve an appropriate balance between the mitigation of threatening processes to facilitate population maintenance and/or recovery, and the control of the species to reduce the impact of the species on community assets. This management program seeks to identify the elements of such an integrated management approach, and identify the factors that need to be considered when planning and implementing different aspects of the management strategy.

5.1 Loss of habitat

Loss of habitat from tree death associated with salinity, paddock tree decline and clearing remains a threat to the species. The remnant vegetation areas and paddock trees on properties throughout its range are not being replaced as they degrade over time and this may eventually impact on the species' breeding and roosting sites.

Feeding areas associated with the broad flat valleys have either been affected by salinity or planted to Tasmanian blue gum plantations rendering these areas not suitable for the birds. The downturn in the blue gum plantation industry is resulting in areas under blue gums declining and returning to pastures which will again open these areas up as potential feeding sites for the birds.

5.2 Illegal culling

As the population of Muir's corella has grown, and the levels of impact on farming businesses, community assets and lifestyle have increased, it has become more likely that those impacted will take direct action to destroy birds and disperse the flocks.

For the species to maintain its status as being non-threatened under IUCN criteria, a stable population size of above 10,000 mature birds needs to be maintained. Historically, uncontrolled culling of this species resulted in a population reduction to very low levels, and the consequent listing of the species as threatened. Poisoning and uncontrolled shooting thus are deemed to be critical threats to this species while this potential for intervention exists.

5.3 Competition for nest hollows - bees

Competition for nest sites with other birds and the feral honey bee *Apis mellifera* is a significant threatening process for Muir's corella (R. Johnstone personal communication). The feral honey bee can form long-term hives in tree hollows and can kill nesting females and chicks in the nest by stinging (R. Johnstone personal communication). The threat posed by feral honey bees is also likely to increase with the southward movement of bees in response to change to a warmer climate in Western Australia.

5.4 Introduced corella species

The little corella *Cacatua sanguinea* and the eastern long-billed corella *Cacatua tenuirostris* have become habituated in south-western Australia, especially within the Perth metropolitan area where they originated from aviary escapees. Flocks of introduced corellas have also been recorded outside the Perth metropolitan area in Mandurah, Bunbury, Busselton, Albany and Denmark (Blyth 2004), although the Denmark population was eradicated 8 to 10 years ago. These corellas pose a threat to Muir's corella because they have similar feeding and breeding requirements (Garnett and Crowley 2000). In addition, if their populations spread into the range of Muir's corella, these species could potentially interbreed (Garnett and Crowley 2000). Similarly, the southward spread of the Butler's corella could threaten the feeding and breeding resources and the genetic integrity of Muir's corella (P. Mawson personal communication).

5.5 Natural threats

There are few natural predators to this species. Community members have observed and recorded birds of prey, in particular, wedge tailed eagles *Aquila audax* successfully hunting and killing individual Muir's corellas from flocks. It is also likely that other large raptor species may take the occasional bird. Chicks and eggs in nest hollows may potentially be vulnerable to carpet python *Morelia spilota* and/or Gould's monitor *Varanus gouldii*.

6 MANAGEMENT RESPONSE

6.1 Monitoring

Parks and Wildlife in conjunction with the local community, neighbours, BirdLife Australia and the Warren Catchments Council will monitor the population of Muir's corella every five years. These five yearly counts will be used to guide future management and engage the community and conservation movement.

The methodology of the monitoring will be that used by Parks and Wildlife to determine the current population. A number of properties where large flocks of birds are prevalent during February/March will be simultaneously counted. This method provided significant evidence of the population size used to de-list the species and is therefore considered an acceptable method for ongoing population monitoring for this species.

Additional monitoring will be required by Parks and Wildlife where damage licences are issued for the lethal take of Muir's corella. Monitoring of individual flock movements will be required to determine if control in one location has an impact in another location and whether a targeted control program can alleviate community issues.

Parks and Wildlife will determine the level of lethal take such that it does not exceed recruitment capacity of the species and that bird numbers do not decline significantly, resulting in the species becoming eligible for listing as a threatened species.

6.2 Community engagement

Parks and Wildlife will continue to be proactive in working with the community and delivering the department's Good Neighbour policy. Ongoing discussions with the Frankland River community and the Shire of Cranbrook will occur regarding the impact of the birds on infrastructure within the Frankland River townsite.

Birds Australia will continue to be an important non-Government organisation interested in the management and outcomes for this species. The 2012 December edition of Western Australian Bird Notes had a feature article on the success of the Muir's Corella Recovery Plan resulting in the species being de-listed.

There is likely to be ongoing media and local political interest in Muir's corella, and Parks and Wildlife will engage in this process through local written media articles, local radio interviews as required and through general contact with neighbours and local communities.

Parks and Wildlife in consultation with the community will review, within 5 years of the approval of this plan, the community information and education package on what can be done to alleviate the level of impact by Muir's corella and the management strategies being implemented to manage the species.

6.3 Non-lethal take

Under the Wildlife Conservation Act, it is illegal to 'take' a native species of fauna without an appropriate licence. The definition of 'take' includes any activity that modifies the birds' natural behaviour, including the use of scare devices. Under section 15 of the Act, where a species of native fauna is known to be causing damage to property, a damage licence may be issued to take that species to mitigate the damage being caused. Such a licence would specify the location and number of animals to be taken, and the manner in which they may be taken.

Prior to any damage licence being issued, Parks and Wildlife will, where damage is reported, arrange for the site to be inspected by the Warren Region Wildlife Officer, or other designated officer, to determine the level of damage and impact being caused by the corellas. The departmental Officer will provide recommendations to the property owner on how to reduce the level of impact and where appropriate issue a damage licence for non-lethal take.

During this assessment phase property owners, community organisations and other land managers impacted by Muir's corella may also be advised to obtain a damage licence should they wish to disturb and disperse the birds to reduce the impact on their business or lifestyle. It is recommended that this occurs through a coordinated strategy.

Non-lethal control techniques should be attempted to control Muir's corella in the first instance. Current accepted methods for non-lethal scaring of birds include:

- laser lights used in the early evening to disturb birds from roost sites near homes;
- strobe lights used as above. Not to be used in towns or by neighbours if there is a possibility of impacting on sufferers of epilepsy;
- gas guns to keep birds off crops, away from grain storage areas and homesteads. Need to comply with relevant noise regulations;

- electronic bird scaring devices;
- vehicles driven through flocks to disperse them; and
- shot gun blanks and birdfrite – used to scare birds off crops and to disperse roosts closer to homes. Birdfrite should not be used during summer because of the risk associated with starting a fire.

Parks and Wildlife, in conjunction with the community, will continue to explore alternative scaring options, or methods of deploying scaring devices, including gas guns, lasers and strobe lights.

6.4 Lethal take

With Muir's corella now not listed as threatened, a damage licence authorising lethal destruction could be issued. However, the retention of the species as "other specially protected fauna" means there is a need for careful management of the species to ensure that it does not again qualify for listing as a threatened species. Lethal destruction of wildlife is generally considered only as last resort solution after other deterrent methods have been tried and deemed unsuccessful.

To maintain the current non-threatened status under IUCN criteria, it is necessary that a stable population size be maintained, or if a decline in the population was to occur, that a minimum population of above 10,000 mature birds be maintained. 10,000 mature birds would appear to be an appropriate minimum viable population size given that Muir's corella has shown strong reliance and ability to recover from a very low population base (100 birds in 1940) to approximately 20,000 birds in 2014. To achieve this, the bulk of the current population will need to be able to mature.

To maintain a stable overall population size, numbers permitted for lethal take in any one year should not exceed the recruitment capacity of the birds. Current knowledge of the birds' biology and ecology indicate that approximately 40 per cent of the population is of breeding age. Based on a current population of 20,000 birds there are approximately 8,000 breeding age birds or 4000 breeding pairs. Assuming each pair successfully raises a single chick, would mean no more than 4000 birds should be culled in any one year.

The Department may consider alternative methodology of calculating levels of lethal take, or the frequency of culling activities, based on the immediacy to reduce population numbers where there is a severe (as determined by Parks and Wildlife in consultation with the landholder/community) level of impact on community and/or landholders. However, this level of take must take into consideration that the number of birds taken will not reduce the estimated breeding population below the threshold for its current conservation status.

Parks and Wildlife can approve lethal take where considered necessary; however Parks and Wildlife will implement a suitable monitoring methodology to ensure the numbers taken are reported and carcasses collected where necessary for DNA testing, and to report the immediate impact of a culling program. Amendment to any culling program may be implemented should the monitoring indicate an adverse impact on the target population beyond that proposed by the culling program. Monitoring of the overall Muir's corella population will need to be carried out once every 5 years to observe and track the numbers and distribution of the birds (see section 6.1).

6.5 Vegetation modification

Removal of roost trees from around homesteads and townsites may be a method of reducing the impact of the birds on households and community lifestyles. However, this strategy will need to be considered against other potential impacts (loss of shade, visual amenity, hydrological impacts, stock shelter etc.). Native vegetation clearing approvals under the *Environmental Protection Act 1986* may also be required.

7 RESEARCH

There is a continued need to undertake a range of research activities looking at both the ecology of Muir's corella and the impacts and appropriateness/success of various levels of deterrent on the population. These include:

- Spatial arrangement of the species in relation to impact areas, including determining flock fidelity and seasonal movement patterns.
- Trials of various scaring devices.
- Monitor impact and effect of lethal take.
- Population ecology, including current breeding success, to assist in determining a suitable level of lethal take.
- Map and monitor expansion into new areas.
- Determine impacts on other hollow nesting species.
- A population viability analysis to guide the management of the species.
- Determine appropriate distance to clear roost trees away from homesteads and the likely success of this strategy. Evaluate against the impact of clearing has on other factors mentioned in 6.5.
- Potential for Muir's corella to spread weed species and other introduced plant species.

A monitoring program is required to identify flight patterns and cluster movements to see if control in one area has an impact in another, and whether a targeted control program can alleviate community issues.

Monitoring will also assist in identifying the effectiveness of culling programs and the recovery of the species after culling programs. The evaluation of this monitoring will assist in refining take quotas and the temporal patterning of culling activities (i.e. annual, biennial, or at some other defined interval or period during the year).

8 MANAGEMENT ACTIONS

It is proposed to take a multi-focused approached to implementing management actions.

Table 1: Management actions

What	When	Who
1. Population monitoring	5 yearly to check population status, can be altered (shortened or lengthened) should Parks and Wildlife determine extenuating circumstances	Department of Parks and Wildlife Species and Communities Branch Warren, Wheatbelt, South West and South Coast Regions
2. Engagement	As per Good Neighbour policy and upon reports of birds impacting on stakeholders	Department of Parks and Wildlife Warren, Wheatbelt, South West and South Coast Regions
3. Non-lethal take (dispersal of birds)	When birds, particularly large flocks, impact on community or individual farming enterprises and lifestyle	Stakeholders under the directions of the Regional Wildlife Officer and under a damage permit issued by Parks and Wildlife
4. Lethal destruction	When dispersal of birds through non-lethal means has not lessened the impact of the birds	Stakeholders under the directions of the Regional Wildlife Officer and under a damage permit issued by Parks and Wildlife
5. Monitoring management actions	After management activities implemented	Department of Parks and Wildlife Warren, Wheatbelt, South West and South Coast Regions and damage permit holders
6. Habitat modification (potentially including roost tree removal)	Birds roosting around homesteads or within townsites causing disturbance	Private property owner under permit for native vegetation clearing when appropriate

9 REFERENCES

Blyth, J. (2004) Sixth and seventh corella counts. *Western Australian Bird Notes* **111**: 1-4.

Brouwer, K. Jones, M.L., King, C.E. and Schifter, H. (2000) Longevity records for Psittaciformes in captivity. *International Zoo Yearbook* **37**: 299-316.

Carter, T. (1912) Notes on *Licmetus pastinator* (Western Long-billed Cockatoo). *Ibis* **6**: 627-634.

Garnett, S.T. and Crowley, G.M. (2000) *The Action Plan for Australian Birds 2000.* Environment Australia, Canberra.

Higgins, P.J. (1999) (Ed.) *Handbook of Australian, New Zealand and Antarctic Birds. Volume 4. Parrots to Dollarbird.* Oxford University Press, Melbourne.

Johnstone, R.E. and Storr, G.M. (1998) *Handbook of Western Australian Birds. Volume 1. Non-passerines (Emu to Dollarbird).* Western Australian Museum, Perth.

Rowley, I. and Mawson, P. (2001) A tale of three birds. *Eclectus* **11**: 11-12.

Serventy, D.I. and Whittell, H.M. (1976) *The Birds of Western Australia (5th edition).* University of Western Australia Press, Perth.

Smith, G.T. (1982) Corella studies. *Swans* **12**: 10-12.

Smith, G.T. and Moore, L.A. (1991) Foods of corellas *Cacatua pastinator* in Western Australia. *Emu* **91**: 87-92.

Smith, G.T. and Rowley, I. (1995) Survival of adult and nestling Western Long-billed Corellas, *Cacatua pastinator*, and Major Mitchell Cockatoos, *C. leadbeateri*, in the wheatbelt of Western Australia. *Wildlife Research* **22**:155-162.