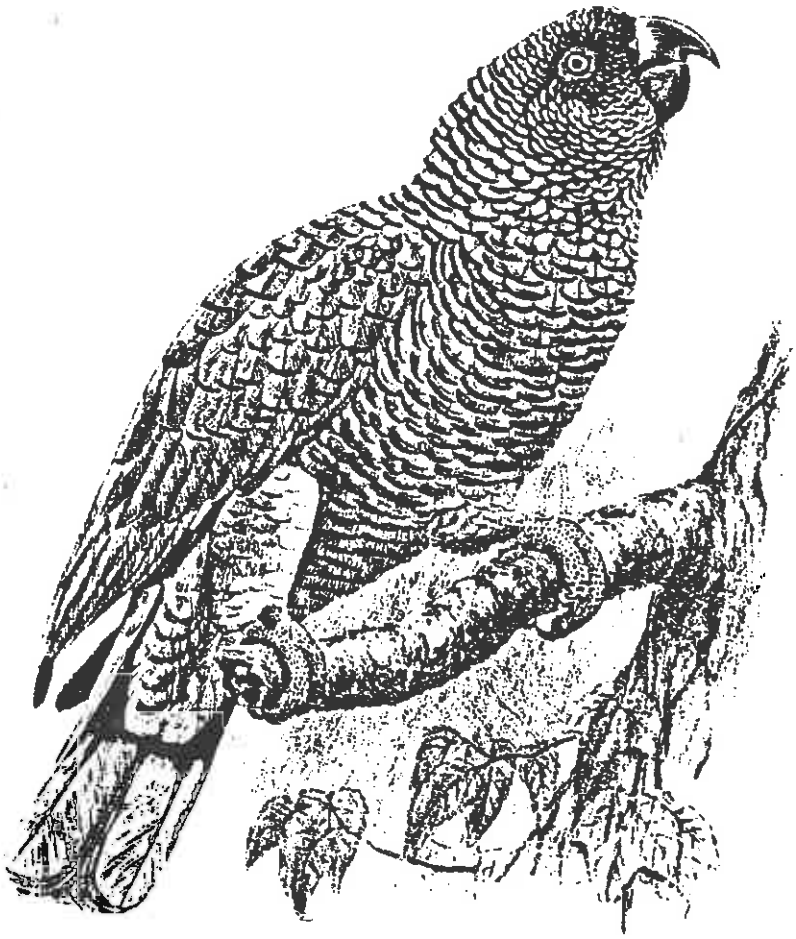
DRAFT 2

Parrots

An Action Plan for their Conservation 1993-1998



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Species Survival Commission

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Preface

An action plan is, self-evidently, action orientated. In the context of ICBP and the Species Survival Commission, an action plan aims to catalyse conservation efforts for the species it covers. It is not intended as an exhaustive nor definitive assessment of the status of individual species but rather a vehicle for prioritising species in terms of their conservation needs and the types of actions required to meet those needs. An action plan is at once specific - focusing on individual taxa - and general, as it highlights broader conservation problems that are also of relevance to the species concerned. Likewise, while it aims to draw on the full breadth of expertise on a group of species and cover the full range of possible threats, it can not, by its nature, represent all views or identify actions to address all threats. Above all, an action plan must be practical and realistic, a building block in the edifice of conservation, the bricks and mortar for which are only now arriving on site.

The need for a global parrot action plan has been recognised for some time. Many species are known to face a combination of threats, and uncertainty exists regarding the status of many more; the absence of baseline biological data for most species attests to the pressing need for a comprehensive strategy for the conservation of the world's parrots. It is paradoxical that while more parrot species are becoming endangered, we are still discovering species that are new to science. Moreover, while many species are endangered as a result of man's activity, others proliferate in a changing environment to the extent that in some countries many parrots are regarded as vermin, threatening crops and the livelihood of people. Yet, also paradoxical is the fact that, while parrots are amongst the most beloved birds in the world, their popularity has itself become a threat to several species' survival as millions of parrots have been removed form the wild to support the cage-bird industry.

The present action plan is the first attempt to survey global parrot conservation needs and suggest priority conservation actions. The plan has been developed with the input of many people, including many with opposing views as to the importance or relevance of certain strategies for effective parrot conservation. Early drafts of the plan generated heated debate, primarily as a result of the perceived prominence afforded to captive breeding in relation to other activities. However unfortunate the conflict, it spurred a ferocious response by a number of expert reviewers that has resulted in a much more rigorous, better balanced, and overall greatly enhanced document.

If all the project concepts outlined in this action plan materialise into concerted actions, many of the immediate threats that face so many parrots will have been curtailed, and the future of many endangered species will look a little bit more secure. However, like in all conservation actions today, lasting solutions can only be attained if our strategies and programmes integrate the needs of the wildlife we seek to protect with the aspirations and welfare of the local human communities.

This action plan represents a starting point rather than the finish and, at its most successful, will render itself obsolete in a very short period of time.

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We also wish to thank the many people who have provided Nigel Collar and his colleagues with information on parrots for the Americas Red Data Book (Collar *et. al.* 1992), as many of their data were used in preparing this Action Plan too.

The preparation of this Action Plan received financial support from the International Council for Bird Preservation, the IUCN (The World Conservation Union) Species Survival Commission Peter Scott Action Plan Fund (supported by the Sultan of Oman), the European Community (DG XI) and TRAFFIC International.

Objectives of the Action Plan

This Action Plan for the Conservation and Management of Parrots aims to promote a process that will prevent the loss of any extant taxa of parrot. By summarising all known parameters of importance, for the conservation of the world's parrot species, it is hoped that the problems affecting threatened[1] taxa can be addressed in a coherent way. This Action Plan is designed to promote efficiency in the allocation of scarce conservation resources, both at the species level, and in a regional context. A final objective of this Action Plan is to bring together institutions and individuals with an expertise in disciplines that form essential components of conservation planning. Safeguarding the world's parrot taxa will rely to a large extent on increased information-sharing and co-operation between the various government institutions and individuals with an interest in parrot conservation.

[1] *Threatened is used in this Action Plan to denote taxa that have been assigned to the Mace-Lande categories of Critical, Endangered or Vulnerable, or intermediate categories of threat (see Table 2).*

Summary

1. This Action Plan provides a framework for conserving the world's parrots, based on the combined expertise of people active in conservation, aviculture and academic research. It is based on a workshop attended by selected members of the Parrot Group of the International Council for Bird Preservation, and the Captive Breeding Specialist Group of the World Conservation Union (IUCN), which was held in Cambridge, UK, in January 1992, and an extensive consultation process in which drafts were sent to 150 experts. The Action Plan identifies threatened species and subspecies of parrot, defines their threats, and proposes projects to remove these threats. Implementation of the recommendations in this Action Plan may cost in the order of US$ 10 million per annum over the next five years. To put this figure into perspective, it represents an estimated 1% of the amount spent world-wide on parrots that are kept for enjoyment.

2. All the species and subspecies considered in the Action Plan were assigned a threat category according to the degree of threat, and the probability of extinction. These threat categories were "Critical" (50% probability of extinction within two generations), "Endangered" (20% probability of extinction within 20 years or 10 generations, whichever is longer) and "Vulnerable" (10% probability of extinction within 100 years). Species or subspecies that were not considered to be threatened were designated as being "Safe".

3. One-hundred-and-five (38%) of the 356 parrot species recognised in this Action Plan are considered to be unnaturally threatened with extinction, and a further 48 species are possibly threatened. In addition, 88 subspecies or subspecies groups have been identified as potential conservation priorities, giving a total of 241 parrot species and subspecies of conservation concern.

4. Threatened parrots tend to have small ranges (<50,000 km^2), and many are island forms. Species that have distribution greater than 100,000 km^2 were generally classified as "Safe", although this was not applied as a rule.

5. Although some species of parrot are very specialised, many others adapt well to man-induced changes in their habitats. Indeed, highly specialized, environmentally sensitive parrots are the exception rather than the rule. Despite their adaptability, a large number of parrot species and subspecies are in decline.

6. The major factors which have contributed to the decline in numbers of threatened parrots include the loss or degradation of their habitat, the wild bird trade, hunting, disease,

predation, and competition with introduced species. Most parrots are threatened by more than one factor.

7. This Action Plan provides outlines of conservation projects which include all species that are regarded as "Critical" or "Endangered". The projects are thought to be the most urgent, and it is hoped that the majority of these can be funded and initiated within the next five years. Projects are classified by geopolitical unit.

8. For the threatened parrots identified in this Action Plan, recommendations are made for the kinds of conservation action necessary to reduce threats, and to promote the recovery in numbers. These include:

Recovery and Population and Habitat Viability workshops, at which the probable consequences of various management actions for the viability of the population are assessed at a consensus building meeting of relevant interests;

More intensive management of wild populations;

Education and public awareness campaigns;

Research to clarify which subspecies and species should be recognised as distinct;

And survey work to assess the sizes of wild populations and their habitat requirements. Captive breeding programmes, and research into the care of parrots in captivity, are also proposed where appropriate.

9. A number of global and regional projects are also suggested. These include a workshop on survey methodology; the development of National and Regional Management Strategies for key areas of parrot abundance and diversity and an Africa-wide project on lovebirds.

I. Introduction

In popular consciousness, parrots have one of the highest profiles of any bird group. People of many different regions and cultures maintain parrots in captivity, a practice extending back several thousand years. Providing meat, feathers, companionship, and beauty, captive wild parrots were kept by ancient Egyptians, early Greeks and Romans, and the native peoples of Southeast Asia, the Caribbean and South and Central America (Mulliken *et al.* 1992). Despite this close association with man, however, parrots are now one of the most endangered orders of birds. One-hundred-and-five of the 356 parrot species recognised in this Action Plan are considered to be threatened [1], and a further 48 species are possibly threatened.

Factors such as habitat loss, hunting, disease, predation and competition with introduced species play significant roles in the survival of endangered parrots. Paradoxically, all too often, threat also stems partly from man's attraction to parrots: they are among the most popular cage and aviary birds worldwide, and the demand generated is a serious threat to a several of the endangered taxa. Many parrots are under threat from several causes, and complex inter-relationships often exist between the various factors threatening individual species. For example, habitat degradation may result in an increase in threat from the trade in live parrots (e.g Lambert 1992c).

Many species of parrot may play important or even keystone roles in the ecosystem, particularly as pollinators. In Australasia, for example, various species of lorikeet may pollinate the flowers of *Eucalyptus* (Ford *et al.* 1979). There is therefore concern that declines in some parrot populations could disrupt the ecosystems they inhabit. With little understanding of the role of parrots in pollination, seed predation or seed dispersal, it is impossible to foresee what the effect of a species' decline or disappearance will be on the surrounding habitat.

Despite their conspicuousness, popularity, and importance in various ecosystems, parrots have been the focus of few scientific studies. They have, nevertheless, long been recognised as a group of major concern to conservationists, and certain threatened species have received much attention. Conservation awareness is clearly also now rising in avicultural circles, and some aviculturists have actively supported conservation efforts through their fund-raising activities for certain parrot species. It is therefore appropriate that these interest groups, who have historically worked rather independently, are now uniting in their efforts to conserve threatened parrots. This Action Plan provides a framework for conserving the world's parrots, based on the

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[1] *Threatened is used in this Action Plan to denote taxa that have been assigned to the Mace-Lande categories of Critical, Endangered or Vulnerable, or intermediate categories of threat (see Table 2).*

combined expertise of people active in conservation, aviculture and academic research.

Implementation of the recommendations in this Action Plan may cost in the order of US$ 10 million per annum over the next five years. This figure can be compared to the amount spent annually on buying and keeping parrots in captivity in the industrialized nations. In the United States alone, the estimated retail value of all neotropical parrots imported in just one year, 1986, was US$ 300 million (Thomsen & Brautigam 1991). If other nations that import parrots in large numbers, such as Japan or the various countries in the European Community were also considered, as well as the amount spent on parrot food and the internal trade in captive bred birds, it is evident that more than one billion US$ are spent on keeping parrots each year.

Hence, the cost of preventing the extinction of any parrot is a mere 1% of the amount spent world-wide on parrots that are kept for enjoyment.

II Taxonomy followed in the Action Plan

The taxonomy in this Action Plan follows Forshaw & Cooper (1989) with a few departures as mentioned below (Table 1). Three-hundred-and-fifty-six extant species of parrots are recognised here, including four species (New Caledonian Lorikeet *Charmosyna diadema*, Sangihe Hanging Parrot *Loriculus catamene*, Paradise Parrot *Psephotus pulcherrimus*, and Glaucous Macaw *Anodorhynchus glaucus*) which may already be extinct (Collar & Andrew 1988), and three 'species' (Rufous-tailed Parrot *Tanygnathus heterurus*, Rothschild's Parrot *Psittacula intermedia*, and Orange-fronted Parakeet *Cyanoramphus malherbi*) which may not be valid taxonomic entities. It has been suggested that the first, known from a single specimen, may be an aberrant specimen of another species (Forshaw & Cooper 1989), but that Rothschild's Parrot may be a valid species or subspecies (Walters 1985). Orange-fronted Parakeet may represent a colour morph of Yellow-crowned Parakeet *C. auriceps* (Taylor *et al.* 1986). Some of these seven taxa may be very rare species, and by implication, highly endangered. To make sure that no taxon is overlooked these questionable species remain on the list of recognised taxa until their status has been resolved.

This Action Plan follows the example of most other Action Plans in that where opinions differ as to whether a particular taxon is a species or subspecies we have decided in favour of species rank. As such, the taxonomy in this Action Plan departs from that of Forshaw & Cooper (1989) as indicated in Table 1.

Amazona kawalli (Grantsau & de Almeida Camargo 1989) and *Nannopsittaca dachilleae* (O'Neill *et al.* 1991) have been described as new species since Forshaw & Cooper (1989), though some authorities remain unconvinced about the specific status of the former (N.J. Collar, pers. comm.). Parrots are, taxonomically, a relatively well studied group, but much

uncertainty still exists. Hence, there are 106 instances where taxonomic research is recommended (Table 5) to resolve issues that will have an impact on conservation decisions, or are perceived to be important for the ex-situ management of parrots.

In addition to the 356 extant species recognised in this Action Plan, 88[2] subspecies or subspecies groups have been identified as potential conservation priorities. The validity of subspecies that are not dealt with separately in this report is not disputed. Singling out particular subspecies or subspecies groups for separate treatment was primarily based on whether a subspecies was thought to be more threatened, or threatened for different reasons, than other populations of the same species. Although subspecies treated in this Action Plan were therefore selected because of threats rather than for taxonomic reasons, all subspecies singled out are nevertheless morphologically distinct.

An increasing number of parrots treated as subspecies a decade ago, are now recognized as full species (e.g Forshaw & Cooper 1989): hence the recognition and inclusion of subspecies perceived as threatened provides a safety measure in view of rapidly changing parrot taxonomy. However, it should be recognised that there are other good reasons for the conservation of subspecies, not least being the fact that by ensuring the survival of as many subspecies as possible, options to preserve a broader spectrum of a species' genetic diversity are increased.

For some parrot species, groups of subspecies have been treated together. These groups include those for which there is less confidence that each subspecies is valid (e.g. the six "small-island subspecies" of Moustached Parakeet *Psittacula alexandri*), and others for which the individual subspecies (e.g. subspecies groups of *Pyrrhura picta* or *Psittaculirostris desmarestii*) all face much the same threats.

Yellow-sided Conure *P. hypoxantha*, Stresemann's Lory *Lorius amabilis* and Blue-thighed Lory *Lorius tibialis* were treated as species by Forshaw & Cooper (1989), but are no longer accepted as recognised species (T. Arndt pers. comm. 1992, N. Collar, pers. comm. 1992, J. R. van Oosten, *in litt.* 1992)

[2] *Taxonomy of subspecies follows Forshaw & Cooper (1989) with the exception of* Cacatua pastinator *(Ford 1987b).*

Table 1. Parrot species recognised in this Action Plan which were treated as subspecies by Forshaw & Cooper (1989). Sources discussing taxonomic status, upon which recognition of species status is based, are also provided.

Recognised as Full Species	Forshaw & Cooper list as subspecies of:	References
Cacatua sanguinea	*C. pastinator*	Ford 1985, 1987a
Calyptorhynchus latirostris	*C. funereus*	Saunders 1979, Sibley & Monroe 1990
Calyptorhynchus baudinii	*C. funereus*	Sibley & Monroe 1990
Psephotus dissimilis	*P. chrysopterygius*	Sibley & Monroe 1990
Prosopeia splendens	*P. tabuensis*	Rinke 1989
Prioniturus platenae	*P. discurus*	Dickinson et al. 1992
P. verticalis	*P. montanus*	Dickinson et al. 1992
P. waterstradti	*P. montanus*	Sibley & Monroe 1990
Poicephalus fuscicollis	*P. robustus*	A. Kemp, pers. comm.
Loriculus catamene	*L. amabilis*	White & Bruce 1986
Loriculus sclateri	*L.amabilis*	Wallace 1862
Loriculus tener	*L. aurantifrons*	Sibley & Monroe 1990
Psittacula finschii	*P. himalayana*	Sibley & Monroe 1990
Aratinga rubritorquis	*A. holochlora*	Arndt 1990
Aratinga brevipes	*A. holochlora*	Collar & Andrew 1988
Rhynchopsitta terrisi	*R. pachyrhyncha*	Hardy 1967, Sibley & Monroe 1990
Forpus spengeli	*F. xanthopterygius*	T.Arndt, *in litt.*, 1992.
Touit costaricensis	*T. dilectissima*	Sibley & Monroe 1990
Hapalopsittaca fuertesi	*H. amazonina*	Graves & Uribe Restrepo 1989
H. pyrrhops	*H. amazonina*	Graves & Uribe Restrepo 1989
Amazona auropalliata	*A. ochrocephala*	Sibley & Monroe 1990
A. oratrix	*A. ochrocephala*	Sibley & Monroe 1990

III The Parrot Conservation Assessment and Management Process (CAMP): Results and Recommendations

The data presented in this Action Plan are the result of the Parrot CAMP workshop and an extensive review process that has taken place subsequently. During this review, population estimates and trends, types of threat, taxonomic status and threat categories that were assigned to parrot taxa at the CAMP workshop have been scrutinised and much modified by soliciting the opinions of over 150 parrot experts, many of whom have very specialised knowledge of certain parrot taxa or regions.

The Parrot CAMP workshop, attended by parrot specialists, members of the Captive Breeding Specialist Group and representatives from Regional Captive Breeding programmes, was held in Cambridge, UK, in January 1992 (CBSG 1992b). During the process, wild and captive data were considered in assessing the threats to parrots and in formulating recommendations for action.

In many cases, parrot population estimates were not available at the CAMP workshop; in all cases, conservative numerical estimates were used, representing first-attempt, order-of-magnitude estimates. As such, it is emphasized that these should not be used as authoritative estimates[3]. Using available data, CAMP workshop participants attempted to apply the criteria of Mace & Lande (1991) for the redefinition of the IUCN Red Data Categories. A simplified definition of the Mace-Lande assessments of threat is presented in Table 2, and the use of these criteria is discussed in the following section.

In assessing threat according to the Mace-Lande criteria, information on the estimates of population size; extent of population fragmentation and genetic isolation; trends in population numbers; and the impact of known threats such as habitat modification and loss, and legal and illegal trade (based on TRAFFIC data) has been used. Catastrophic events, such as the occurrence of volcanic eruptions and hurricanes, were also taken into consideration where appropriate.

Numerical information about a species was not sufficient, alone, for assignment to one of the three Mace-Lande categories. For example, based on numbers alone, a taxon might be assigned to the "Vulnerable" category. Knowledge that the taxon is under severe threat in its natural habitat, that the population is declining, or that the population is severely fragmented might lead to assignment in the Endangered category.

For the 241 taxa placed in a category of threat (Table 3), recommendations were formulated for the kinds of conservation action necessary. These recommendations included more intensive *in situ* management, recovery programmes, taxonomic research, and survey work, recovery workshops (including

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[3] *Note however, that a significant number of the estimates in the Action Plan are based on expert opinion and recent surveys (as indicated in the "data quality" column of the Species Status Spreadsheets). These data are believed to be authoritative estimates.*

Population and Habitat Viability Assessment (PHVA) workshops). These recommendations are summarised in the Species Status Spreadsheets (section VI). Only the more urgent captive breeding programmes are endorsed in this five-year Action Plan (section VIII): many programmes of less urgent priority were recommended in the CAMP workshop (CBSG 1992). Approximately half the parrot taxa considered in the Action Plan were judged to be "Safe" by Mace-Lande criteria (Figure 1).

One-hundred-and-fifty-five of the 356 species (43%), and an additional 88 subspecies are assigned to a category of threat (including those taxa considered as "possibly threatened": Table 3). A total of 71 taxa were assigned as "Critical" or "Endangered" in comparison with 15 taxa classified as "Endangered" by IUCN (1990). Eight of the fifteen parrot species that were considered "Endangered" by IUCN were placed into the "Critical" category using Mace-Lande criteria.

Threatened parrots tend to have small ranges, and many are island forms (Figure 2 and Table 4). Thus, 92% of the 112 island taxa considered were classified as threatened, or "possibly threatened", whilst 52% of the species in the Mace-Lande Critical category were island forms. Species that had a distribution greater than 100,000 km^2 were generally classified as "Safe", although this was not applied as a rule, with *ca.* 83% of 203 such taxa falling into this category.

The recommendations that were made were based entirely on conservation criteria, and on the status of a species or subspecies throughout its *entire* range. Therefore, a taxon like the Southern Blue-fronted Amazon *Amazona aestiva xanthopteryx*, which has greatly declined in Argentina due to trade, but remains common to even abundant throughout the greater part of its range has been classified as "Safe" for the period covered by this Action Plan (five years). Likewise, suggestions to consider entirely speculative threats (i.e. future trade in a species which is neither seriously threatened by trade now nor of particular interest to the "rarity collectors") were rejected, as such a strategy would result in almost every existing taxon of parrot being placed in a category of threat, and attention would undoubtedly be diluted away from taxa needing immediate conservation efforts.

Recommendations for the conservation of parrots that were judged to be threatened by Mace-Lande criteria, are summarised in Table 5. One conclusion of the workshop was the recognition that there is an urgent need to pool the information on parrots with that for other threatened taxa to facilitate the design of multiple species management programmes. The identification of centres of concentrated avian endemism, or "Endemic Bird Areas", by ICBP (1992) will greatly facilitate this gaol.

The recommendations of the CAMP process highlighted a recurrent need for survey information to evaluate population status and trends (Table 5). If parrot populations are to be managed, or harvested sustainably, regular monitoring and an accurate picture of population trends is essential, as well as a better understanding of species-specific ecology and demography.

However, in view of the lack of standard methodology to deal with such monitoring (e.g., see Lambert 1992b), the need to establish tested methodologies should be made a priority. Appendix 1 outlines the various methods that have been used to estimate parrot population sizes.

III.II Use of Mace Lande Criteria

The application of Mace-Lande Criteria to assign threat categories to different taxa (Mace & Lande 1991) has been the focus of controversy. Most discussion has centred around the difficulty of applying the criteria to taxa where the data available do not allow adequate evaluation of the population parameters listed as criteria. Despite this reservation, this Action Plan has attempted to assign Mace-Lande categories of threat to all taxa, in the conviction that the Mace-Lande system is an improvement on the previous categories adopted by IUCN in the Red Data Book series (Extinct, Endangered, Vulnerable, Rare and Indeterminate). These latter categories were based largely on subjective judgements, whereas the Mace-Lande system attempts to introduce objectivity and quantification.

It is not argued here that the Mace-Lande system is an ideal system, but is an improvement to the former system of assigning threat category, since it introduces objectivity where supporting data exist. The threat categories for those taxa lacking such data are essentially still subjective, as in the Red Data Book system, but this is reflected in this Action Plan by the recognition that many taxa cannot be assigned to one of four Mace-Lande Categories (Critical, Endangered, Vulnerable, Safe) and are assigned to intermediate categories (e.g. Vulnerable\Safe, Endangered\Vulnerable). By highlighting instances where data are insufficient to provide clear-cut categorisation, it is hoped that efforts will be made to provide such data during the next five years, particularly in cases where taxa are thought to be in the higher categories with respect to threat.

The primary aim of this Action Plan is to focus attention on threatened taxa. None of the existing or proposed threat category systems will satisfy all conservation biologists, and whilst the adoption of one system over another will therefore attract some mistrust, few could argue that many of the taxa listed as Critical or Endangered in this Action Plan should be ignored by conservationists.

Table 2. Mace-Lande categories and criteria of threat

Population Trait	CRITICAL	ENDANGERED	VULNERABLE
Probability of extinction	50% within 5 years or 2 generations, whichever is longer	20% with 20 years or 10 generations, whichever is longer	10% within 100 years
	OR Any 2 of the following criteria:	OR Any 2 of the following criteria or any CRITICAL criterion	OR Any 2 of the following criteria or any 1 ENDANGERED criterion
Effective population Ne corresponding to total population size Nt	Ne.< 50 Nt.< 250	Ne.< 500 Nt.< 2,500	Ne.< 2,000 Nt.< 10,000
Subpopulations	≤2 with N.>25,N>125 with immigration <1/generation	≤5 with N.>100,N>500 or ≤2 with N.>250,N>1,250 with immigration <1/gen	≤5 with N.>500,N>2,500 or ≤2 with N.>1,000,N>5,000 with immigration < 1/gen
Population decline	>20%/yr. for last 2 yrs. or >50% in last generation	>5%/yr. for last 5 years or >10%/gen. for last 2 gen	>1%/yr, for last 10 years
Catastrophe: rate and effect	>50% decline per 5-10yrs or 2-4 generations; subpops. highly correlated	>20% decline/5-10yrs.2-4 gen >50% decline/10-20yrs. 5-10gen. with subpops. highly correlated	>10% decline/5-10yrs. >20% decline/10-20yrs. or >50% decline/50 yrs. with subpops. correlated
OR			
Habitat change	resulting in above pop. effects	resulting in above pop. effects	resulting in above pop. effects
OR			
Commercial exploitation or Interaction/introduced taxa	resulting in above pop. effects	resulting in above pop. effects	resulting in above pop. effects

Figure 1. Threatened parrot taxa divided according to size of range (km^2)

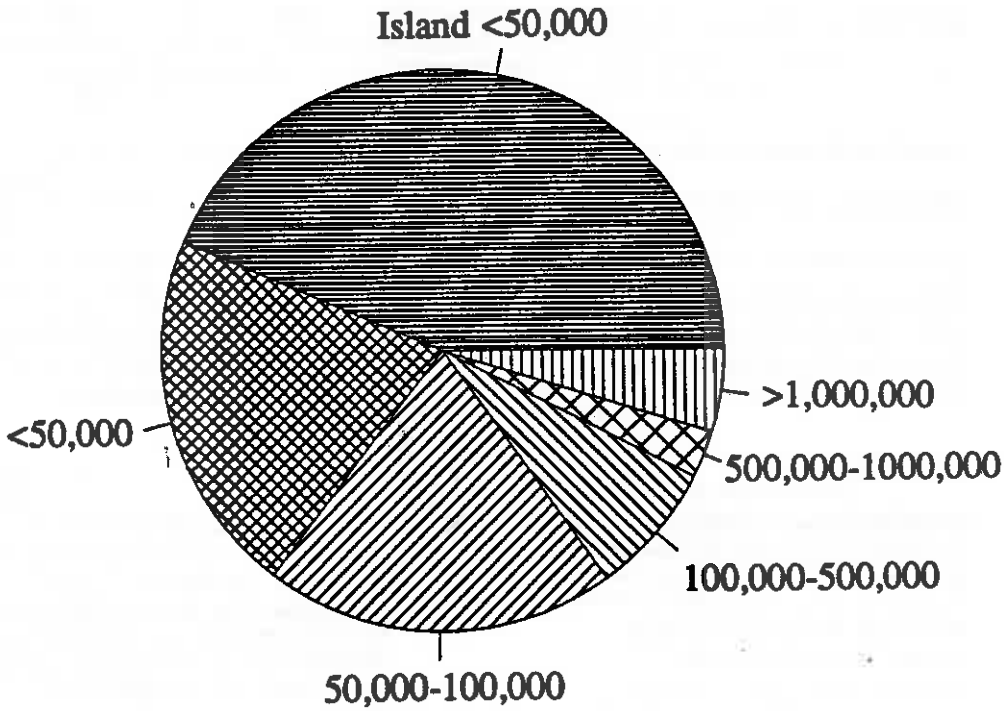

Table 3. The number of parrot taxa in the different Mace-Lande Categories of threat.

Mace-Lande Category	Species	Subspecies	Total
Critical/Extinct	4	2	6
Critical	13	6	19
Critical/Endangered	3	2	5
Endangered	27	14	41
Endangered/Vulnerable	12	9	21
Vulnerable	46	31	77
Possibly Threatened	48	24	72
Total of Conservation Concern	153	88	241
Total Safe	203	-	203
Total	356	88	444

Taxa in threatened categories are listed below:

CRITICAL/EXTINCT

Red-and-blue Lory	*Eos histrio histrio*
New Caledonian Lorikeet	*Charmosyna diadema*
Paradise Parakeet	*Psephotus pulcherrimus*
Cebu Hanging Parrot	*Loriculus philippensis chrysonotus*
Sangihe Hanging Parrot	*Loriculus catamene*
Glaucous Macaw	*Anodorhynchus glaucus*

CRITICAL

Ultramarine Lorikeet	*Vini ultramarina*
Citron-crested Cockatoo	*Cacatua sulphurea citrinocristata*
Red-vented Cockatoo	*Cacatua haematuropygia*
Coxen's Fig Parrot	*Cyclopsitta diophthalma coxeni*
Norfolk Island Parrot	*Cyanoramphus novaezelandiae cooki*
Ouvea Horned Parrot	*Eunymphicus cornutus uvaeensis*
Orange-bellied Parrot	*Neophema chrysogaster*
Siquijor Hanging Parrot	*Loriculus philippensis siquijorensis*
Echo Parakeet	*Psittacula eques*
Lear's Macaw	*Anodorhynchus leari*
Spix's Macaw	*Cyanopsitta spixii*
Yellow-eared Conure	*Ognorhynchus icterotis*
Miritiba Pearly Conure	*Pyrrhura picta coerulescens*
Azure-winged Parrot	*Hapalopsittaca fuertesi*
Red-faced Parrot	*Hapalopsittaca pyrrhops*
Red-tailed Amazon	*Amazona brasiliensis*
Puerto Rican Amazon	*Amazona vittata*
Imperial Amazon	*Amazona imperialis*
Kakapo	*Strigops habroptilus*

CRITICAL/ENDANGERED

Talaud Red-and-blue Lory	*Eos histrio talautensis*
Nenusa Red-and-blue Lory	*Eos histrio challengeri*
Moluccan Cockatoo	*Cacatua moluccensis*

Tanimbar Corella	*Cacatua goffini*
Margarita Blue-crowned Conure	*Aratinga acuticaudata neoxena* (valid?)

ENDANGERED

Black-winged Lory	*Eos cyanogenia*
Purple-naped Lory	*Lorius domicellus*
Chattering Lory	*Lorius garrulus garrulus*
Yellow-backed Lory	*Lorius garrulus flavopalliatus*
Morotai Chattering Lory	*Lorius garrulus morotaianus*
Henderson Lory	*Vini stepheni*
Kuhl's Lory	*Vini kulhi*
Tahitian Lory	*Vini peruviana*
Sulawesi Yellow-crested Cockatoo	*Cacatua sulphurea sulphurea*
Lesser Sunda Yellow-crested Cockatoo	*Cacatua sulphurea parvula*
Abbott's Yellow-crested Cockatoo	*Cacatua sulphurea abbotti* (valid?)
White Cockatoo	*Cacatua alba*
Kaka	*Nestor meridionalis*
Sulu Racket-tail	*Prioniturus verticalis*
Mindanao Mountain Racket-tail	*Prioniturus waterstradti*
Blue-naped Parrot	*Tanygnathus lucionensis*
Cornelia's Eclectus Parrot	*Eclectus roratus cornelia*
Golden-shouldered Parrot	*Psephotus chrysopterygius*
Western Ground Parrot	*Pezoporus wallicus flaviventris*
Night Parrot	*Geopsittacus occidentalis*
Forbes Yellow-fronted Parrakeet	*Cyanoramphus aurcieps forbesi*
Seychelles Black Parrot	*Coracopsis nigra barklyi*
Cape Parrot	*Poicephalus robustus*
Western Black-collared Lovebird	*Agapornis swinderniana swinderniana*
Fischer' Lovebird	*Agapornis fischeri*
Black-cheeked Lovebird	*Agapornis nigrigenis*
Hyacinth Macaw	*Anodorhynchus hyacinthinus*
Golden-plumed Parakeet	*Leptosittaca branickii*
Maroon-fronted Parrot	*Rhynchopsitta terrisi*
Rufous-fronted Parakeet	*Bolborhynchus ferrugineifrons*
Ceara White-eared Parakeet	*Pyrrhura leucotis griseipectus*
Rusty-faced Parrot	*Hapalopsittaca amazonina*
Reichenow's Blue-headed Parrot	*Pionus menstruus reichenowi*
Red-necked Amazon	*Amazona arausiaca*
St Lucia Amazon	*Amazona versicolor*
St Vincent Amazon	*Amazona guildingii*
Cayman Brac Amazon	*Amazona leucocephala hesterna*
Mexican Yellow-headed Amazon	*Amazona oratrix* (3 Mexican subspecies)
Green-cheeked Amazon	*Amazona viridigenalis*
Lilacine Amazon	*Amazona autumnalis lilacina*
Red-browed Amazon	*Amazona rhodocorytha*

ENDANGERED/VULNERABLE

Blue-streaked Lory	*Eos reticulata*
Mitchell's Lory	*Trichoglossus haematodus mitchelli*
Green Racket-tail	*Prioniturus luconensis*
Blue-crowned Racket-tail	*Prioniturus discurus*
Timor Great-billed Parrot	*Tanygnathus megalorhynchus hellmayri*
Tanimbar Eclectus Parrot	*Eclectus roratus riedeli*
Halmahera King Parrot	*Alisterus amboinensis hypophonius*
Philippine Hanging Parrot	*Loriculus philippensis* ssp (five)
Wallace's Hanging Parrot	*Loriculus flosculus*
Nicobar Parakeet	*Psittacula caniceps*
Mexican Military Macaw	*Ara militaris mexicana*
Buffon's Macaw	*Ara ambigua*
Colombian Painted Conure	*Pyrrhura picta* (3 Colombian subspecies)
Panama Painted Conure	*Pyrrhura picta eisenmanni*
Flame-winged Parakeet	*Pyrrhura calliptera*
White-breasted Parakeet	*Pyrrhura albipectus*
El Oro Parakeet	*Pyrrhura orcesi*
Yellow-shouldered Amazon	*Amazona barbadensis*
Marajo Yellow-crowned Amazon	*Amazona ochrocephala xantholaema*
Red-spectacled Amazon	*Amazona pretrei*
Vinaceous Amazon	*Amazona vinacea*

VULNERABLE (INCLUDING ?VULNERABLE)

North Moluccan Violet-necked Lory	*Eos squamata riciniata*
Obi Violet-necked Lory	*Eos squamata obiensis*
Blue-eared Lory	*Eos semilarvata*
Forsten's Lory	*Trichoglossus haematodus forsteni*
Djampea Lory	*Trichoglossus heamatodus djampeanus*
Stresemann's Lory	*Trichoglossus heamatodus stresemanni*
Biak Rainbow Lory	*Trichoglossus heamatodus rosenbergii*
Johnstone's Lory	*Trichoglossus johnstoniae*
Biak Black-capped Lory	Lorius lory cyanauchen
White-naped Lory	*Lorius albidinuchus*
Yellow-bibbed Lory	*Lorius chlorocercus*
Red-throated Lorikeet	*Charmosyna amabilis*
Carnaby's Black Cockatoo	*Calyptorhynchus latirostris*
Aru Sulphur-crested Cockatoo	*Cacatua galerita eleonora*
Southwestern Longbilled Corella	*Cacatua pastinator pastinator*
Kea	*Nestor notabilis*
Salvadori's Fig Parrot	*Psittaculirostris salvadorii*
Abbott's Blue-rumped Parrot	*Psittinus cyanurus abbotti*
Rennell Island Singing Parrot	*Geoffroyus heteroclitus hyacinthinus*
Blue-headed Racket-tail	*Prioniturus platenae*
Montane Racket-tail	*Prioniturus montanus*
Red-spotted Racket-tail	*Prioniturus flavicans*
Talaud Racket-tail	*Prioniturus platurus talautensis*
Pesquet's Parrot	*Psittrichas fulgidus*
Taveuni Red-shining Parrot	*Prosopeia tabuensis taveuniensis*
Kandavu Red-shining Parrot	*Prosopeia splendens*
Amboina King Parrot	*Alisterus amboinensis amboinensis*
Sula King Parrot	*Alisterus amboinensis sulaensis*
Peleng King Parrot	*Alisterus amboinensis versicolor*
Buru King Parrot	*Alisterus amboinensis buruensis*
Superb Parrot	*Polytelis swainsonii*
Eastern Regent Parrot	*Polytelis anthopeplus anthopeplus*
Antipodes Green Parrakeet	*Cyanoramphus unicolor*
Red-fronted Parakeet	*Cyanoramphus novaezelandiae*
Chatham Red-fronted Parakeet	*Cyanoramphus n. chathamensis*
Yellow-fronted Parakeet	*Cyanoramphus auriceps auriceps*
Orange-fronted Parakeet	*Cyanoramphus malherbi* (valid?)
Swift Parrot	*Lathamus discolor*
Nyasa Lovebird	*Agapornis lilianae*
Banggai Hanging Parrot	*Loriculus sclateri ruber*
Andaman Alexandrine Parrot	*Psittacula eupatria magnirostris*
Malabar Parakeet	*Psittacula columboides*
Emerald-collared Parakeet	*Psittacula calthropae*
Derbyan Parakeet	*Psittacula derbyana*
Javan Moustached Parakeet	*Psittacula alexandri alexandri*
Island Moustached Parakeet	*Psittacula alexandri* (6 sspp.)
Nicobar Parakeet	*Psittacula caniceps*
Blue-throated Macaw	*Ara glaucogularis*
Red-fronted Macaw	*Ara rubrogenys*
Illiger's Macaw	*Ara maracana*
Golden Conure	*Guaruba guarouba*
Soccoro Conure	*Aratinga breviceps*
Chapman's Conure	*Aratinga mitrata alticola*
Hispaniolan Conure	*Aratinga chloroptera*
Cuban Conure	*Aratinga euops*
Golden-capped Conure	*Aratinga auricapilla*
Jamaican Parakeet	*Aratinga nana nana*
Greater Patagonian Conure	*Cyanoliseus patagonus byroni*
Blue-chested Parakeet	*Pyrrhura cruentata*
Goias White-eared Parakeet	*Pyrrhura leucotis pfrimeri*
Southern White-eared Conure	*Pyrrhura leucotis leucotis*
Bolivian Monk Parakeet	*Myiopsitta monachus luchsi*
Yellow-faced Parrotlet	*Forpus xanthops*
Grey-cheeked Parakeet	*Brotogeris pyrrhopterus*
Huallaga Cobalt-winged Parakeet	*Brotogeris cyanoptera gustavi*
Red-fronted Parrotlet	*Touit costaricensis*
Brown-backed Parrotlet	*Touit melanonota*
Golden-tailed Parrotlet	*Touit surda*
Saffron-headed Parrot	*Pionopsitta pyrilia*
Yellow-billed Amazon	*Amazona collaria*

Grand Cayman Amazon	*Amazona leucocephala caymanensis*
Bahama Amazon	*Amazona leucocephala bahamensis*
Hispaniolan Amazon	*Amazona ventralis*
Black-billed Amazon	*Amazona agilis*
Lilac-crowned Amazon	*Amazona finschi*
Purple-bellied Parrot	*Triclaria malachitacea*

Figure 2. Parrot taxa considered in the Action Plan divided by Mace-Lande threat status (see Tables 2 and 3).

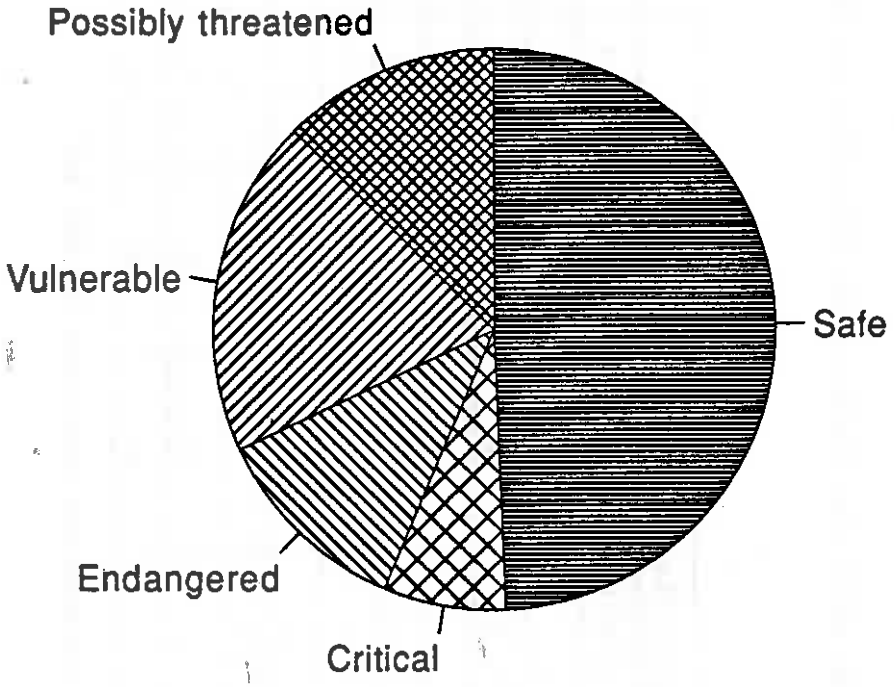

Table 4. Category of threat classification with the Mace/Lande criteria in relation to range size and island endemism.

	Range Size (1,000 km²)						
MACE/LANDE	**Island[#]**	**<50**	**50-100**	**100-500**	**500-1000**	**>1000**	**TOTAL**
Critical/extinct	4	1		1			6
Critical	9	8	1	1			19
Critical/Endangered	5						5
Endangered	18	10	6	3	3	1	41
Endangered/Vulnerable	11	6	3	1			21
Vulnerable	34	15	20	5	1	2	77
Possibly Threatened	22	12	20	7	3	8	72
Safe	9	3	22	63	31	75	203
Total	112	55	72	81	38	86	444

[#] ***Island denotes those species restricted to islands of less than 50,000 km².***

Table 5. Management and research recommendations made for parrot taxa.

	Population Survey	*In Situ* Management	Recovery Workshop	Recovery Efforts	Taxonomy Research	Husbandry Research
	198	133	56	13	106*	32
Pending Survey		34	84	3		
Pending Taxonomy		2				

** priorities for taxonomic research are indicated in Table 6*

IV Threats Facing Parrots

Although some species of parrot are very specialised, many others adapt well to man-induced changes in their habitats. Indeed, highly specialized, environmentally sensitive parrots are the exception rather than the rule, and most parrots can tolerate a certain amount of habitat modification, hunting or trapping.

Some of these species have even proliferated as a consequence of man's activities. In Australia, for example, the Galah *Eolophus roseicapillus* and Eastern Rosella *Platycerus eximius* have greatly expanded in numbers and distribution as a result of changes in land-use (Rostron 1969, Forshaw 1981, Rowley 1991). The Monk Parakeet *Myiopsitta monachus*, provides another example of a species which has benefitted from the activities of man, and, in parts of Argentina and Uruguay, their communal nests are regularly poisoned in order to reduce population size (Bucher & Nores 1988, Forshaw & Cooper 1989). The feral populations of this species, which inhabit various parts of North America and Europe, provide a further illustration of the adaptability of many psittacines. Indeed, Long (1981) documented a minimum of nineteen species of parrot which have become naturalised, with viable populations outside of their natural range, whilst eleven years later, Thomsen & Mulliken (1992) record at least 27 such cases from the United States of America alone.

Whilst adaptability has enabled certain parrot species to proliferate in the wake of man's activities, the longevity of parrots is also an important consideration. The fact that many species of parrot are very long-lived (Forshaw & Cooper 1989) may facilitate conservation efforts, which sometimes take years to design and implement. On the other hand, however, seemingly stable populations may suddenly crash to the point of no return if recruitment has been negligible due to unidentified threats. Some populations of the Red-vented Cockatoo *Cacatua haematuropygia*, for example, may now be dominated by aging individuals, since heavy trapping pressure during the last decade is likely to have prevented recruitment (Lambert 1992c). It is therefore imperative that regular assessments of the effects of potential threats to parrots in all threat categories be made.

Despite their adaptability, a large number of parrot taxa are in decline: some are threatened with extinction. The causes of decline derive from a suite of threats which threaten not only parrots, but also the world's entire avian biodiversity (ICBP 1992). The following sections document the various types of threat that affect parrots.

Whilst parrots may often be able to tolerate individual threats, populations of many species are likely to be more vulnerable if several types of threat act simultaneously. Indeed, such a situation is usually the rule rather than the

exception: most endangered parrot species are affected by more than one category of threat. Combinations of threats may interact in such a way that species become seriously endangered within one generation. Hence concern over the effect of trapping on wild parrot populations is heightened by the knowledge that many species are already declining in the wild as a result of habitat loss.

IV.I Habitat Loss, Fragmentation and Degradation

For many parrot species, loss of habitat, or essential components of habitat, has been the most important factor leading to population decline. For many parrots inhabiting forests, for example, clear-felling to provide land for agriculture or other uses has occurred over large areas of their ranges. Whilst man is responsible for much of this loss, natural events such as hurricanes, may also play important roles (see e.g. Evans 1991, Collar *et al.* 1992). Forest loss has not, however, been geographically or geopolitically uniform. In the Philippines, for example, forest cover has been reduced to a fraction of its former extent, whilst in much of adjacent Indonesia, forest cover is still extensive (Collins *et al.* 1990).

In the Philippines, clearance of forest is undoubtedly largely responsible for the rarity of the five endemic species of Racquet-tail *Prioniturus* spp. (Collar & Andrew 1988, Dickinson *et al.* 1991, F. Lambert, unpubl.) and in particular, for the precipitous decline in numbers of the Red-vented Cockatoo. This endemic cockatoo was very common throughout the archipelago last century, but is now critically endangered (Lambert 1992c).

Another region which has suffered greatly from massive forest loss is the Caribbean. In this region, the clearance of a large proportion of forest has been exacerbated by serious habitat degradation by hurricanes and volcanic eruptions. Largely as a consequence, five species of *Amazona* parrot are critically endangered on the various islands of the Caribbean. Populations of all five species are, however, also affected by other factors, such as hunting, which have contributed to their low population size (Collar *et al.*, 1992).

Whilst gross clearance of forest habitat has been a major factor responsible for the decline of certain parrot species, many species are also susceptible to the effects of habitat modification. In many tropical forests, the practice of selective logging, in which only the larger commercially valuable trees are removed, is now the major cause of habitat modification.

Although it has been demonstrated that, in certain regions at least, selectively-logged forest support the great majority of bird species that are present in unlogged forests (e.g. Johns 1986, Lambert 1992a), larger parrots may be particularly

vulnerable to the effects of this practice. For example, Macaw *Ara* spp. populations declined following selective logging in French Guiana (Thiollay 1992). A likely explanation for such decline may be related to breeding requirements: many parrots nest in the cavities of larger trees. However, the paucity of autecological data means that there are few cases where it can be proven that the loss of breeding habitat, rather than other causes, has been the primary factor responsible for declines in parrot populations.

In the neotropics, evidence that nest sites may be a limiting demographic factor has been provided by studies of Macaws *Ara* spp. in pristine forests (Munn 1988a, 1988b, 1992). The loss of nest sites, through selective logging, is thought to be a major factor in the decline of Red-vented Cockatoos in the Philippines (Lambert 1992c). Nesting sites may also be destroyed when parrots are trapped for trade (Bucher 1990; Iñigo-Elias and Ramos 1991).

It should also be reiterated that the opening up of areas by logging may promote other types of threat, such as hunting and trapping, because of increased accessibility.

A number of parrot species are dependent on rare forest types, and are therefore particularly vulnerable to habitat loss. One example is provided by the Yellow-eared Parrot *Ognorhynchus icterotis*, which may be confined to wax palm forest in the northern Andes. Less than fifty individuals of this species may survive as a result of habitat loss, and the species is clearly on the edge of extinction (Collar *et al.* 1992).

Whilst many species of parrot are inhabitants of forested areas, some highly specialised species occupy other habitats, such as grasslands, sedgelands, dunes and heathlands, or depend on grasses within forest ecosystems. A number of these species, particularly in Australasia, have been affected by fire. In certain cases, where fire may occur naturally, changes in the fire regime have been responsible for the decline in parrot populations.

Fire has been responsible for both habitat loss and changes in the abundance of food resources for certain parrot species. For example, one subspecies of the Ground Parrot *Pezoporus wallicus flaviventris*, is endangered due to the burning of its heathland habitat, whilst changes in the fire regime within the breeding habitat of the Orange-bellied Parrot *Neophema chrysogaster*, in Tasmania, has been identified as the primary cause for this species decline. The populations of two species of *Psephotus*, one of which might already be extinct, have declined partly as a consequence of the burning of grasses which provide an important food resource within their savannah habitats (Brouwer & Garnett 1990).

Another form of habitat degradation, which, in certain cases, may contribute to the threats that parrots face, derives from competition with domestic animals. Foraging by cattle within

the habitat of the critically endangered Lear's Macaw *Anodorynchus leari*, has been identified as a major threat to the long-term survival of the latter (Collar *et al.* 1992). Consumption by cattle of Licuri palm *Syagrus coronata* seeds, which form an essential part of the diet of Lear's Macaw, may limit the supply of ripe nuts for Macaws at certain times of the year. Furthermore, *Licuri* palms are no longer regenerating in any areas used by livestock, suggesting that Lear's Macaw may have serious problems with locating food resources in the future, if measures to rectify this problem are not addressed.

IV.II The Parrot Trade

Trade contributes significantly to the threats facing many psittacines, although it has rarely been responsible on its own for their decline (Imboden 1992, Thomsen & Mulliken 1992). In a few instances, it has become the most critical factor threatening parrots. Parrots form the second largest group of birds in international trade. The vast majority of parrots in trade are imported to serve as pets for private individuals. With all but two parrot species included in the CITES[4] Appendices, trade figures for this order are relatively comprehensive compared to those for passerines, the largest group in trade in terms of total volume.

The net reported trade in parrots for the years 1982 to 1988 ranged from a low of 476,917 birds per year to a high of 624,198, and averaged 539,701 birds per year (Broad 1990). This estimate does not include birds that die during capture, transport or holding prior to export; nor does it include domestic trade, or undocumented illegal trade. Available information indicates that pre-export mortality, domestic and illegal trade all involve large numbers of birds (Mulliken *et al.* 1992).

The "blue macaws" are perhaps most frequently used to illustrate trade-induced population declines: the wild population of Hyacinth Macaw *Anodorhynchus hyacinthinus* has declined dramatically due to trapping for both domestic and international trade. The remaining population is severely threatened by the illegal trapping that continues despite trade controls (Munn *et al.* 1989).

Perhaps more dramatic is the case of Spix's Macaw *Cyanopsitta spixii*, a species whose range and population size were very restricted even before human interference. The combination of habitat loss and trapping for supply to specialised collectors appears to have destroyed the last known wild population of

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[2] *The Convention on International Trade in Endangered Species of Wild Fauna and Flora. An international treaty which seeks to protect species affected by significant trade, and to regulate or prohibit trade in those species endangered by the trade (see Brautigam 1992).*

this species, of which only one specimen is believed to remain in the wild (Thomsen & Munn 1988; Juniper & Yamashita 1991).

Whilst a number of other neotropical parrots are also seriously affected by the wild-bird trade, in particular a number of species in the genus *Amazona*, trade in parrots is by no means confined to the neotropics. Wild-caught parrots are traded from most parts of the developing world, where they provide an important source of revenue for some individuals, though the great majority of the financial gain is made in the consumer countries of the developed world.

An overview of the trade in wild birds (Mulliken *et al.* 1992) demonstrates that certain countries in Asia and Africa also export very large numbers of parrots. Old World examples of parrots that are seriously threatened by trade include the Black-cheeked Lovebird *Agapornis nigrigenis*, Fischer's Lovebird *A .fischeri*, Cape Parrot *Poicephalus robustus* and several species of Indonesian cockatoos *Cacatua* spp. and lories *Lorius* and *Eos* spp. (Collar & Stuart 1985, Anon. 1992a).

It is important to note by contrast, however, that trade may not be having a significant impact on the populations of some smaller and generally more prolific species with relatively widespread distributions, even though absolute trade volumes are high. The failure of eradication schemes for Monk Parakeet illustrates this point (Forshaw & Cooper 1989).

The problem of assessing whether current trade levels are sustainable is particularly difficult for parrots because of the general lack of biological information, particularly with regard to the age structure, for parrots harvested for trade. It appears that, for most species, the majority of parrots in trade have fledged prior to being trapped.

For some species, the removal of breeding age adults from a population may have a larger overall impact on that population than the collection of juveniles or nestlings (Beissinger & Bucher 1992). If breeding-age adults are trapped in significant numbers relative to a species' biology and population dynamics, then the reproductive capacity of populations as a whole could be diminished. This problem may be especially acute for species with slow recruitment rates, such as larger species of parrots, although it should not be assumed that this is true for all large species, since in the case of Major Mitchell Cockatoo *Cacatua leadbeateri*, the opposite may be true (Rowley & Chapman 1991). Munn (1988a) found that only two out of twenty or more pairs of Blue-and-yellow Macaw *Ara ararauna* observed daily in 1986 were nesting, suggesting that this species might breed only once every several years. From observations of three macaw species in undisturbed habitat, Munn (1988b) noted that less than one-fifth of all pairs of adult macaws were observed with young at the end of the breeding season.

It therefore seems likely that removal of a significant portion of the breeding age population of the larger macaws could result in irreversible declines in the total numbers of birds in the wild. Trade may contribute to the threats facing at least three species of *Ara* macaw: Scarlet Macaw *Ara macao*, Buffon's Macaw *Ara ambigua* and Military Macaw *Ara militaris*.

For many species, the removal of nestlings would probably have a smaller impact on populations as a whole than would removal of a similar number of breeding age adults (Beissinger & Bucher 1992). Juvenile mortality rates are naturally higher than that of adults: hence many of the nestlings that could be removed for trade would not have survived to maturity in the wild. As a management approach, collection of nestlings may therefore not be as detrimental to wild populations as the indiscriminate harvest of all age groups, provided that harvest rates were sustainable and that nesting habitat was not destroyed in the process. Several studies in Argentina and Mexico have documented that collection of *Amazona* nestlings for trade destroyed large numbers of suitable nesting sites across large areas of habitat (Bucher 1990; Iñigo-Elias and Ramos 1991). It is important, however, that detailed studies of breeding biology and demography are undertaken prior to recommending any utilisation of parrots based on nestling harvesting.

It should also be noted that the excessive removal of nestlings could lead to changes in age-structure that, though not necessarily apparent, may endanger the survival of the taxa in the long-term. Many parrots are long-lived, and an aging population may appear healthy, even when recruitment is very low. Populations with such an age structure might dwindle, perhaps even crash, to critically low levels as older birds die of natural causes.

Trade-related concerns also extend to the potential impact of parrots on ecosystems and agriculture. Several species popular in the pet trade, such as the Monk Parakeet *Myiopsitta monachus* and Rose-ringed Parakeet *Psittacula krameri*, are considered agricultural pests in one or more of their countries of origin. If trade even temporarily reduces populations of 'pest' species' in areas where they have increased in response to habitat modification then agriculture in those areas may benefit. The classification of parrots as pests, should, however, be carefully scrutinised, since crop damage by pests is often exaggerated (Bucher 1992). Over-exploitation of cockatoos *Cacatua* spp., for example, has been justified by claiming they are pests despite evidence to the contrary (Milton & Marhadi 1987, Milton 1988).

Another trade-related problem is the release of confiscated parrots into the wild, often in large numbers, which constitute a danger to the health and genetic integrity of wild populations. Appendix 4 provides some guidelines for dealing with confiscated birds.

Finally, it should be noted that changes in legislation aimed at protecting endangered parrots can, initially, have serious negative effects on the very species that they are designed to protect. Learning that a species is likely to become unavailable for import, exporters or breeders may try to secure as many wild-caught specimens as possible, prior to trade becoming prohibited. This occurred when Salmon-crested Cockatoo *Cacatua moluccensis* was proposed for inclusion in CITES Appendix I. Exporters and aviculturists began "buying up" this species months before the CITES meeting at which it was actually prohibited in international commercial trade (Thomsen & Mulliken 1992), and this species is still trapped in large numbers despite international legislation (F. Lambert, pers. obs., 1992).

Hence the inclusion of certain psittacines in CITES listings can, temporarily, increase the significance of trade as a threat, although this should not be used as an argument against imposing strong conservation legislation and international legislation. Trade prohibitions may also, inadvertently, affect the trade levels of other psittacines, since the prohibition in trade in one species may increase demand for other, lesser protected, parrots. It should also be noted that in countries such as Indonesia, where the domestic market for parrots is enormous, the listing of species on Appendix I of CITES may simply divert birds from international to domestic markets. The imposition of a moratorium on trade in parrots that are seriously threatened is therefore not necessarily an effective measure in protecting parrots from unsustainable trapping.

IV.III Hunting

The hunting of parrots for food, feathers and sport has contributed to the declines of certain species, and indeed has probably been responsible for the extinction of a number of island species, such as the Norfolk Island Kaka *Nestor productus* (Forshaw 1981). Past hunting has contributed to the rarity of some species which are now critically endangered, particularly in the neotropical region. Good examples are the Hyacinth Macaw *Anodorynchus hyacinthinus*, hunted for its feathers and meat (Munn *et al.* 1989), and the four endemic Lesser Antillean parrots (St Vincent Amazon *Amazona guildingii*, St Lucia Amazon *A. versicolor*, Red-necked Amazon *A. arausiaca*, and Imperial Amazon *A. imperialis*) all of which have been hunted for food in the past (Collar *et al.* 1992).

In the Caribbean, the five species of parakeet, three species of amazon, Hispaniolan Macaw *Ara tricolor* and up to six other species of macaw that are known to have become extinct on the various islands (Wiley 1991) were most likely heavily hunted. Hunting is also implicated as a causal factor in the disappearance of lories of the genus *Vini* from various Polynesian islands. Two of these species *V. sinotoi* and *V.*

vidivici are now extinct, whilst others still survive though much reduced in range (Steadman & Zarriello 1987, Steadman 1989).

IV.IV Predation

Predation is a factor which has mainly affected the survival of island birds. A number of vertebrates which have been introduced onto remote islands, such as rats *Rattus* spp., cats *Felis catus* and stoats *Mustela erminea*, have had serious consequences for many island taxa, including parrots (Moors 1985, Johnson & Statterfield 1990). On many islands, bird communities have evolved in the absence of large numbers of predators, or often, any mammals, and are hence ill-adapted to withstand the depredations of introduced predators.

One of the most well documented cases of a species nearly driven to extinction due to the activities of introduced predators, is the Kakapo *Strigops habroptilus*, a unique, flightless, nocturnal parrot. Once numerous and widespread in New Zealand, no more than 54 individuals were known to exist in early 1992 (D. Merton, pers comm. 1992). Whilst forest clearance was undoubtedly a major cause of past decline, predation by introduced mammals contributed to the species demise, and is now the major threat to existing birds, currently confined to a few small islands.

Translocation of Kakapo to predator-free islands has been necessary to save the species from extinction, since cats were rapidly killing remaining birds (Anon. 1985, Powlesland 1989) in the largest known wild population.

The chance of accidental introductions of rats to various islands is a major threat to island endemics (e.g. King 1981, Moors 1985, Collar & Andrew 1988). Currently stable populations of species such as the Antipodes Parakeet *Cyanoramphus unicolor*, which is common within its very restricted range (Taylor 1985), must be safeguarded against such events if their future is to be assured.

Introduced mammals, therefore, have clearly played an important part in the decline of certain parrot species. However, not all threats from predation are attributed to introduced mammals. On Puerto Rico, the Puerto Rican Amazon *Amazona vittata* had, until 1976, suffered from egg and nestling mortality inflicted by Pearly-eyed Thrashers *Margarops fuscatus*. The Thrasher is a competitor for nest sites, and, prior to the provision of alternative nest sites, preyed on unguarded parrot eggs and chicks whilst prospecting for nests (Wiley 1985, Snyder *et al.* 1987).

IV.V Competition

Competition for nest sites has been identified as a potential threat to certain species of parrot. One of several threats to Caribbean amazons is competition with thrashers. The Puerto Rican Amazon, for example, competes with Pearly-eyed Thrashers *Margarops fuscatus* for nest holes (Snyder *et al.* 1987), and evidence strongly suggests that the St Lucia Amazon faces similar competition. Whilst Pearly-eyed Thrasher was a rare species on St Lucia in 1950, it is now common and has been observed repeatedly interfering with parrots in the breeding season (Jeggo 1977, 1981). Introduced Honey Bees *Apis mellifera* may also compete with psittacines for nest holes. At least two parrots are threatened by Honey Bees: the Norfolk Island Green Parrot *Cyanoramphus novaezelandiae cookii*, and Regent Parrot *Polytelis a. anthropeplus* (Garnett 1992). Circumstantial evidence also suggests that competition with Honey Bees is yet another threat faced by the Puerto Rican Amazon (Snyder *et al.* 1987).

Competition with introduced fauna for food resources may also pose a threat in some instances, although such competition is difficult to demonstrate unless intensive ecological studies are undertaken. One such study, on South Island, New Zealand, documented the competition for honey dew between introduced wasps *Vespula* spp. and the Kaka *Nestor meridionalis*. In the autumn, the number of wasps built up to plague proportions and consumed most of the honey dew excreted by the scale insect *Ultracoelostoma assimile*. The shortage of this food source was identified as the limiting factor that prevented successful breeding of Kaka (Beggs & Wilson 1991).

Although few examples exist, the possibility that successful populations of introduced parrot species could compete for nest sites or other resources with indigenous species, must also pose a potential threat in certain regions. One proven example where this has occurred is on Norfolk Island, Australia, where one of the threats to the Norfolk Island Red-fronted Parrot *C. n. cooki* is competition with introduced Crimson Rosellas *Platycerus elegans*, as well as introduced Starlings *Sturnus vulgaris* (Garnett 1992).

Captive parrots in private hands often escape or are deliberately released. These parrots have sometimes established breeding populations. For example, at least five species of *Amazona* introduced to Puerto Rico may compete or hybridize with the endangered Puerto Rico Parrot *Amazona vittata* and require a permanent and costly population control (Wiley, pers. comm.). In some instances, conservation authorities have themselves potentially added to the problem. For instance, confiscated Red-fronted Macaws *Ara rubrogenys* have been released in Amboro National Park, Bolivia, far outside its natural range (Boussekey *in litt.* 1992)

Cockatoos, and Lories of the genera *Eos* and *Lorius*, are commonly kept as cage birds in Indonesia. The fact that

Indonesian parrots are widely traded, so that individuals of one species are often found caged on islands where endemic congeners occur, should give some cause for concern. Cockatoos and lories of several species have been recorded feral on a number of islands in the Indonesian and Philippine archipelagos, and feral populations have established in some localities (White & Bruce 1986, Dickinson *et al.* 1991, D.Yong, pers. comm., 1990).

IV.VI Disease and Parasites

Disease has been suspected of contributing to the decline of a number of endangered species of bird, little evidence is available to substantiate these suspicions, particularly in the case of parrots (Cooper 1989). This is largely because of the serious difficulties in detecting and identifying the existence or determining the role of infectious disease in wild bird populations. For example, although mosquito-borne avian malaria may have contributed to population declines of two small-island Polynesian endemics, the Blue Lorikeet *Vini peruviana*, and the Ultramarine Lory *Vini ultramarina* (King 1981), there is as yet no convincing evidence for this.

A second, perhaps more serious aspect of disease, stems from the accidental introduction of avian diseases into wild parrot populations. This can occur if caged parrots escape, or, paradoxically, when confiscated parrots are released without prior quarantine and veterinary inspection. Some severe avian diseases, such as Parrot Wasting Disease and Pacheco's Disease, can be carried for years without any signs of infection (Wiley *et al.* 1992).

In Palawan, reports suggest that Newcastle Disease and Psittacine Beak and Feather Disease may now afflict wild populations of the Red-vented Cockatoo *Cacatua haematuropygia* in one of the species' last strongholds. These diseases are reported to have been introduced into the wild population when captive individuals carrying the disease were released (A. De Dios, pers. comm. 1991). Psittacine Beak and Feather Disease has been detected in twelve newly-caught Red-vented Cockatoos imported into the USA (R. van Oan Oosten, *in litt.*, 1992). Release of aviary birds may also have caused disease in populations of the western population of Major Mitchell's Cockatoo *Cacatua leadbeateri mollis* (Garnet 1992b).

In Australia, nematode infections have been responsible for killing captive native parrots, whilst wild Australian parrots that have been examined have never carried these nematodes. In contrast, a dead feral Peach-faced Lovebird *Agapornis roseicollis* was found to have an infestation (Mawson 1985). There is therefore clearly the potential that parasites such as nematodes could affect native wild populations if infected captive birds escape or are released without adequate vetting.

Finally, it should be added that disease is one of the most serious threats to parrots in captivity. The prevention and detection of diseases is hence of serious concern to captive breeding programmes for conservation.

IV.VII Hybridisation

Escaped or released parrots not only pose a threat from the point of view of introducing disease, or competing with native parrots, but, in certain instances, may hybridise with related, wild, taxa. Hybridisation is potentially a serious threat because it places the genetic integrity of wild taxa in jeopardy through genetic introgression or outbreeding depression (reduced fertility or fitness of offspring). The extent of hybridisation is currently unknown, but the number of parrots that are released or escape from captivity is certainly underestimated, and therefore cause for concern.

Even sympatric species can hybridise, if, for instance, ecological or behavioral separation is disrupted as a result of human disturbance. For example, habitat degradation on Chatham Island is suspected to have facilitated the hybridisation of the sympatric Red-Crowned Parakeet *Cyanoramphus novaezelandiae chathamensis* and the Forbe's Yellow-crowned Parakeet *C. auriceps forbesi*, threatening the survival of the latter (Taylor 1985, Triggs *et. al.* 1988). While it is clear that hybridisation is sometimes a direct result of human activity, the exact factors favouring it are not well understood.

In captivity, many parrot taxa hybridise freely, as demonstrated by the long list of hybrids reported in the avicultural literature. Even distantly related species can hybridise in captivity. That hybrid pairs often form despite the presence of potential breeding partners of the appropriate species, indicates that partner selection in at least some parrot species can be easily disturbed.

The presence of non-native pet parrots, often closely related to a threatened endemic taxon, has been recorded in many key areas for parrot conservation ranging from Biak and Seram to Puerto Rico or Cayman Brac, holding potential risk for the genetic integrity of threatened endemic taxa.

IV.VIII Inbreeding Depression

The threats facing many species of parrot have led to population declines. Once population size becomes very small (a few tens to a few hundreds of individuals), this may, in itself, pose a threat to a taxon's survival. Small population size is often associated with unbalanced sex ratios and the difficulty of finding mates.

Small population size over several generations can result in loss of genetic diversity in the population. Depending on the genetic make up of the founder population, this loss of genetic diversity may or may not result in "inbreeding depression" (i.e. reduced fertility or fitness, low hatchability of fertile eggs, poor survival of young and increased disease susceptibility; Soule 1980, Senner 1980, Ralls *et al.* 1980, Gilpin & Soule 1986). Even if inbred populations escape any apparent loss of short-term fitness, reduced genetic variability may affect the taxon's long term fitness, through reduction in evolutionary potential.

V Parrot Conservation: the Way Ahead

As shown in this Action Plan, threats facing parrots are complex, making it impossible to formulate standard approaches to their conservation. Threats facing each taxon must therefore be carefully evaluated before recommending the necessary actions for their conservation. The types of projects that are recommended as necessary to conserve the world's parrot species can be roughly divided into the categories that are discussed below.

V.I Surveys

Surveys are frequently recommended because of the present paucity of information on distribution and population sizes of many psittacines. Surveys can lead to better estimates of population size, and a more robust understanding of status, as well as assisting in the identification of key sites where conservation efforts for the taxon may be concentrated. Whilst surveys alone will not save species, they are fundamental prerequisites to the evaluation of conservation needs. In general, surveys are relatively inexpensive, but nevertheless of great importance.

Where possible, and in particularly in the case of species that may be declining rapidly or are traded as pets, surveys should be periodically repeated, preferably at least once every five years.

V.II *In Situ* Management

In situ management is recommended for threatened taxa for which we can be confident that information on status is sufficient to justify the implementation of long-term conservation efforts. For many taxa, the primary aim of *in situ* management is habitat protection or habitat recovery, and/or control of trapping and hunting, often best achieved by the gazettement, financial support of, and effective management of wildlife reserves and national parks. Populations of the majority of the taxa for which *in situ* management is recommended are in decline, and stabilising the population at present levels must be the immediate goal to be achieved.

Projects falling in this category may include a variety of different endeavour, such as improved protection of reserves, education programmes, and limiting economic conflicts. *In situ* management also frequently incorporates the need for on-going research projects that enable the fine-tuning of management programmes.

In most cases, this form of conservation has major benefits in terms of the conservation of biodiversity. For example, ICBP

(1992) has demonstrated that 77% of bird species that are considered threatened are restricted range species, and have identified 221 avian centres of endemism (endemic bird areas: EBAs) worldwide. One-hundred-and-forty-one extant parrot species occur in EBAs, of which 100 are considered threatened, or include at least one threatened subspecies (based on Mace-Lande criteria). Hence the conservation of threatened parrots by means of projects which protect or manage their habitats, potentially contribute significantly to the conservation of avian biodiversity. *In situ* management projects, though relatively expensive, are therefore nevertheless cost-effective in terms of their overall impact on threatened species and the conservation of biodiversity.

V.III Recovery Efforts

Recovery efforts, involving "hands-on" manipulation of wild populations or their habitats, are recommended for the relatively few taxa for which traditional *in situ* management is considered insufficient to prevent the extinction of the taxon. Taxa in need of recovery are primarily those with such small or fragmented and rapidly declining populations that loss of genetic variability, and inbreeding, are anticipated to increase with every generation. These populations may also run a risk of extinction through stochastic events such as the outbreak of disease, or natural events such as hurricanes. Depending on the social structure of the taxon in question, small population size in itself may also affect breeding success.

The management of critically small populations requires input from biologists, conservation managers and technical specialists. Consensus is best formed at a "recovery workshop". Intensive recovery efforts can include provision of additional artificial nest sites, supplementary feeding, disease prevention, genetic monitoring, active predator or competitor control, artificial incubation of eggs and artificial rearing of chicks, cross-fostering of eggs and chicks between wild and captive (if available) populations, and other reproductive manipulation. A special category of recovery effort would be habitat restoration, in which, for example introduced plants and animals are eradicated and/or native plants are replanted.

Compared to other taxonomic groups of vertebrates, few critically endangered parrots have been the subject of intensive *in situ* recovery management, but examples where this approach is now starting to show positive results are the Kakapo *Strigops habroptilus* (P.Garland, pers. comm. 1992, Merton 1992), the Norfolk Island Kakariki *Cyanoramphus novaezelandiae cookii* (Garnett 1992) and the Puerto Rico Amazon *Amazona vittata* (Collar *et al.* 1992).

V.IV Education and Public Awareness

Some of the most successful conservation programmes involving parrots have incorporated intensive eduction and public awareness campaigns. Such campaigns are likely to benefit conservation efforts most effectively in situations where the range of the parrot taxon in question is relatively small, in particular on small islands. For example, public awareness campaigns on several Lesser Antillean islands, most notably St Lucia, Dominica and St Vincent (e.g. Butler 1991) has contributed considerably to the conservation efforts that have proceeded simultaneously. On St Vincent, the captive breeding programme run by the Forest Division also functions as a valuable environmental education and public awareness resource (D. Jeggo, *in litt.* 1992).

Successful education campaigns have also been initiated in Bahia, Brazil, where both Spix's Macaw and Lear's Macaw are now the subject of conservation efforts (Pontual 1992). In the case of Spix's Macaw, the success of the education campaign, and involvement of the local community in conservation efforts will to a large extent determine the success of reintroduction efforts.

V.V Recovery Workshops

Recovery workshops are an important step in the development of a comprehensive conservation and recovery programmes for threatened taxa. Recovery workshops should normally be held in a range country of the taxon in question, usually at the invitation of the national governmental wildlife agency. Participants to any such workshop should include leading field-based experts on the target taxon, members of the authorities responsible for the taxon's conservation, and experts on the management of small populations.

The main value of these workshops is to gather all available appropriate expertise and to reach agreement on necessary conservation action among the scientific experts and political decision makers involved with the taxon in question. By facilitating the involvement of personnel from government agencies and scientists in the discussion and decision-making progress, recovery workshops can provide an effective and relatively economical means of encouraging rapid political decision-making for urgent conservation action.

If comprehensive biological data on critically threatened taxon are available, a Population and Habitat Viability Analysis (PHVA) should be considered as an option for assessing the conservation needs of a taxon. PHVAs have primarily been developed by the IUCN/SSC[5] Captive Breeding Specialist Group, and have already been conducted on a number

[5] *Species Survival Commission of IUCN - the World Conservation Union*

of highly threatened parrot species. For many parrot taxa however, the necessary biological data for conducting this type of workshop are still inadequate.

PHVAs use computer models to explore extinction processes that operate on small, often fragmented, populations of threatened taxa, and to examine the probable consequences of various management actions or inactions for the viability of the population. The models use information on genetic and demographic characteristics of the population to simulate probable fates (especially the probability of extinction and loss of genetic variation) under various environmental scenarios. The primary computer programme that has been used for the modelling to date is VORTEX, developed by Dr. R. Lacy of the Chicago Zoological Society.

As a result of the different scenarios modelled, it is possible to recommend management actions that maximize the probability of survival or recovery of the population. The management actions that may be recommended are diverse, and may include: establishment, enlargement, or more management of protected areas; control of hunting; reintroduction or translocation; captive breeding; husbandry research; sustainable-use programmes; and/or education efforts.

PHVAs for parrots have been held for Caribbean Amazons, two of New Zealand's parrots (the Kaka *Nestor notabilis* and the Kea *Nestor notabilis*) and Spix's Macaw *Cyanopsitta spixii*. Further information on the PHVA process is available from the Captive Breeding Specialist Group of the IUCN Species Survival Commission.

V.VI Ecological Research

Whilst there have been a number of ecological studies on parrots, there are still many threatened taxa which are very poorly known. Long-term ecological research projects that investigate such parameters as demography, diet, habitat use and movements can therefore contribute greatly to an understanding of the threats and conservation needs of threatened taxa. Unfortunately, however, the serious threats faced by many taxa often require implementation of conservation actions before comprehensive long-term studies have been undertaken.

If possible, the Action Plan would advocate that conservation programmes for parrots should include a research component that seeks to investigate the ecology of the taxa as well as monitoring the effectiveness of conservation efforts. Long-term research programmes would in many cases enable a careful evaluation of threats and fine-tuning of conservation programmes. However, in view of the relatively small pool of parrot experts who are able to devote their time to field studies, and limited financial resources presently available for such studies, it is recognised that the number of taxa

that can be the subject of detailed scientific field studies is limited.

On the other hand, the Action Plan does not advocate the support of research programmes on parrots that are not part of an integrated conservation programme or have no conservation value. Research projects on threatened parrots carried out in isolation may have little or no impact on the conservation of the taxon under study, and may, in some instances, compete for funds with other, direct, conservation activities.

V.VII Taxonomic and Genetic Research

Taxonomic research, as documented in the projects section, is of great importance in facilitating the identification of taxa that should receive attention from conservationists. Such research may clarify whether some taxa presently recognised as subspecies should be recognised as species, or better define the degree of subspeciation within a species throughout its range. Taxonomic investigations require relatively small investments of resources, and are regarded here as a cost-effective approach to identifying certain priorities. Though the resolving of taxonomic issues will not lead to reducing the threats faced by parrots, they may prevent wasteful usage of conservation resources. Genetic research could also assist in resolving taxonomic problems.

Genetic research is of paramount importance in designing and monitoring translocation and hands-on management programmes, such as that for the Kakapo *Strigops habroptilus* (see Triggs *et al.* 1989). DNA fingerprinting would also have great value in designing captive management programmes and in the identification of individuals used in such programmes. This fingerprinting would enable the identification of birds in such schemes and their progeny, and enable them to be distinguished from wild caught birds that may be claimed to have been captive bred. Finally, DNA extraction and analysis from museum specimens would be extremely useful in providing comparative data on historical vs. present levels of introgression/ hybridisation.

V.VIII Husbandry Research

Husbandry research is recommended for taxa for which insufficient is known about husbandry to actively manage a taxon for conservation. Normally, husbandry research is directly related to captive maintenance and captive breeding. The resulting knowledge can, nevertheless, be widely applied to intensive *in situ* management, as in the case of the Kakapo (Lloyd 1992, Garland, in press).

Although a great variety of parrot taxa have been maintained in captivity, and many have successfully reproduced, some commonly kept species do not breed in captivity **regularly** or

predictably: hence captive breeding can not yet sustain captive populations of many species at present levels without further importation from the wild (Derrickson & Snyder 1992). Husbandry research may include study on topics such as the nutritional needs of a taxon, social and pair-bonding behaviour, or factors affecting the synchronisation of breeding behaviour by partners.

V.IX Captive Breeding

Whilst the conservation of most parrot taxa in the wild is the most desirable and feasible option, the maintenance of captive populations of psittacines is important in some cases where future conservation needs may include reintroduction, or where loss of genetic variation is a major concern. Captive propagation is, in a few cases, the only option available for the conservation of a parrot species (e.g. Spix's Macaw).

In many instances, conservation efforts based on captive breeding and reintroduction, may not be as effective as intensive management of wild populations and their habitats. As an example, the calls for and establishment of a captive breeding population of the St Lucia Amazon *Amazona versicolor*, considered vital to the species survival in 1975, have since become marginalized by *in situ* management, and the captive programme is justified more as a reservoir against total failure of the wild population (Collar *et al.* 1992).

Where captive populations are recommended for conservation purposes, every effort should be made to use existing birds in public and private collections, and co-ordination based on demographic and genetic considerations is essential. Captive breeding is discussed in more detail in section VIII and recommendations are provided in Appendix 2 for setting up breeding programmes. It is of vital importance that conservation efforts based on captive breeding do not distract attention from the needs of extant wild populations.

V.X Translocation

Reintroduction, restocking and introduction are becoming more widely used as conservation tools. There is, however, much confusion as to the meaning of these terms, and activities which are really restocking activities are often, for example, inappropriately called reintroductions.

Guidelines are provided, by the Species Survival Commission of IUCN, for the identification of when these activities could be appropriately used as conservation tools, and on what minimum precautions need to be considered before carrying out such activities (IUCN 1987a). It is recommended that these guidelines are strictly followed when carrying out any reintroduction, restocking or introduction experiment with parrots.

Restocking (releasing any specimen in an already existing wild population) should only be conducted under circumstances where it is certain that the wild population will benefit, such as, for example, when the wild population is suffering from inbreeding depression. Restocking for other reasons, such as to solve the problem of what to do with confiscated birds, is not considered an appropriate measure by IUCN (1987a). Restocking carries a considerable risk of disease transmission, social disruption of the wild population, hybridisation or outbreeding depression,particularly if the exact geographic origin of the released birds is not known.

Apart from the biological considerations, reintroduction and restocking does have political and educational aspects to it, and careful planned projects can stimulate much conservation awareness both among politicians as well as among the general public (Durrell *et. al.* 1987).

With respect to parrots, few translocations for conservation purposes have been completed. The Kakapo *Strigops habroptilus*, discussed elsewhere, was translocated successfully to predator-free islands in the face of intense predation. Efforts to translocate other species, such as the Uvea Horned Parrot *Eunymphicus cornutus uvaeensis*, which was translocated to islands with better habitat (Wiley *et al.* 1992), have failed. Nevertheless, the techniques for transfer are now well established in some parts of the world, such as in New Zealand, and there is therefore great potential in using translocation as a conservation tool in the future.

The status and strategy of translocations have recently been reviewed in detail (Griffith *et al.* 1989). Where translocation may be necessary to assist the survival of critically endangered species, it should be conducted before the density of the species concerned has become too low (Griffith *et al.* 1989). It is also recommended that translocation should be given priority over a captive breeding program, or proceed simultaneously.

Experiments with Thick-billed Parrot *Rhynchopsitta pachyrhyncha* and Hispaniolan Parrot *Amazona ventralis* releases have indicated that the establishment potential of translocated wild-caught parrots is superior to that of captive-bred individuals (Snyder & Johnson 1988, Wiley *et al.* 1992). However, there have been at least three successful translocations of Red-crowned Parakeets *Cyanoramphus novaeseelandiae novaeseelandiae* in New Zealand from captive-bred stock (R. Hay, *in litt.* 1992).

VI Species Status Spreadsheets

The Species Status Spreadsheets provide an overview of all information considered to be relevant to the conservation needs of the worlds parrots. All species recognised in this Action Plan are included. The following three pages provide a guide to the use of the spreadsheets.

Scientific Name — Refer to section II (Taxonomy) of the Action Plan for explanations.

Threatened taxa (except V? and V/S categories) are denoted by shading.

Subspecies (SS) — Denotes number of recognised subspecies

World Range — Denotes geographic range of the species or taxa.
[] Brackets denote parts of range where introduced.

Population Size Estimate — In many cases, these estimates represent first-attempt order-of-magnitude estimates. As such, it is emphasized that these should not be used as authoritative estimates.

Data Qual. — The **Data Quality** column refers to the quality of information on which population estimates and trends are based.

DATA QUAL.	*Explanation*
1	Recent census or population monitoring
2	Recent general field work on the taxon
3	Anecdotal field information
4	Indirect evidence (e.g. trade volumes, habitat quality, range)
1/4 etc.	Indicates different data quality for different parts of the range.

Pop. Trend — The **Population Trend** column denotes the numerical population trend of a species.

POP. TREND	*Explanation*
S	Population levels are stable. In some cases when a great deal of recent information is not available, species have been listed as **S?**
I	Population levels are increasing.
D	Population levels are decreasing.
Ex?	Possibly extinct.

Area of Range

The **Area of Range** column is an effort to quantify a species' actual geographic distribution. The following categories were used:

AREA OF RANGE	*Criteria*
Is	Island < 50,000 square kilometres
A	< 50,000 square kilometres (smaller than Bhutan)
B	50,000-100,000 square kilometres (between Bhutan and Moluccan Islands)
C	100,000-500,000 square kilometres (smaller than Thailand)
D	500,000-1000,000 square kilometres (between Thailand and Indonesia)
E	> 1,000,000 square kilometres (larger than Indonesia)

Mace-Lande Status

The **Mace-Lande** status column (**M/L**) lists the assignment of threat status according to Mace-Lande criteria. See Table 2.

Ex Extinct	
C	Critical (scientific name in bold capitals)
E	Endangered (scientific name in bold, genus in capitals)
V	Vulnerable (scientific name in bold)
C/E, V/E etc	in several cases, taxa could not be assigned to one category with certainty. When intermediary categories were given the one before the slash is thought to be the more likely assignment.
V/S, S?	Possibly Threatened (Insufficiently known)
S	Safe

Threats

The **Threats** column describes the kinds of events that threaten the species.

THRTS	*Threat*
H	Hunting
Hy	Hybridisation (including a known hybridisation problem and a high risk due to widespread keeping of related subspecies within a taxon's range)
C	Inter-specific Competition
L	Habitat Loss
P	Predation
T	Trade
t	Potential Trade
D	Disease
F	Changes in Fire Regime

Recommendations for Conservation Action

The **Recommendations** column lists the recommendations for the kinds of intensive action that would benefit the species.

WORKSHOP	Recovery Workshop. Where possible, multi-taxa workshops should be held. If sufficient data are available, a PHVA should be considered
IN SITU	More intensive *in-situ* management
T	Taxonomic relationship or geographic genetic variation needs further investigation
S	Survey work in the wild is needed
H	Husbandry research is needed to allow captive or intensive *in-situ* management of a taxon
Pend S	Pending results of survey

Species Status Spreadsheet

SCIENTIFIC NAME			WILD POPULATION STATUS							RECOMMENDATIONS			
GENUS	SPECIES / SUBSP.	SS	WORLD RANGE	POPULATION SIZE EST.	DATA QUAL.	POP. TREND	AREA OF RANGE	M/L	THRTS	WORK-SHOP	*IN SITU*	RECO-VERY	T/S/H
LORIINAE													S,T
Chalcopsitta	*atra*	3	Irian Jaya (Indonesia)	>50,000	3/4	S	B	S	L,t				S
Chalcopsitta	*duivenbodei*	2	Irian Jaya (Indonesia), Papua New Guinea	>50,000	3	S	C	S?	L,t				
Chalcopsitta	*sintillata*	3	Aru Is, Irian Jaya (Indonesia), Papua New Guinea	>100,000	3/4	S	C	S	L,t				
Chalcopsitta	*cardinalis*		Bismarck Arch. (PNG), Solomon Is.	>100,000	2/3	S	Is	S	L,t				
Eos	*cyanogenia*		Biak, Numfor, Manim, Meos Num (Indonesia)	<5,000	2/3	D	Is	E	T,Hy	Pend S	Y		S
Eos	*squamata*	4	eastern Indonesia	>10,000	4	S?	Is	S?	t				S
	E.s. riciniata		north Moluccas	>50,000	1/3	D	Is	V	T	Y	Y		T
	E.s. obiensis		Obi (north Moluccas)	>7,000	1	D/S	Is	V	T,Hy	Pend S	Y		
Eos	*reticulata*		Tanimbar Is. (Indonesia)	10,000-50,000	3	D	Is	V/E	T	Pend S	Y		S
Eos	*histrio*	3	Indonesia				Is			Pend S			
	E.h.histrio		Sangihe/Siau, Ruang	Ex-1,000?	4	?	Is	C/Ex	L	Pend S	Y		S
	E. h. talautensis		Talaud	<2,000	2	D	Is	E/C	L,t	Pend S	Y		S
	E. h. challengeri		Miangas	?	4	?	Is	E/C?	?		Y		S
Eos	*bornea*	2	Moluccas (Indonesia)	>1,000,000	1	D	Is	S?		Pend S			S
Eos	*semilarvata*		Seram (Indonesia)	5,000-50,000	2	S	Is	V					
Pseudeos	*fuscata*		Irian Jaya (Indonesia), PNG	>>100,000	3	S	D	S					
Trichoglossus	*ornatus*		Sulawesi & satellite islands (Indonesia)	>>50,000	3	S	C	S	L,t				
Trichoglossus	*haematodus*	21	Indonesia, Papua New Guinea, Solomon Is., Vanuatu, New Caledonia (France), Australia	>>5,000,000	2/3	S	E	S					
	T.h. mitchellii		Bali/ Lombok (Indonesia)	>5,000	3	D	Is	V/E	T,Hy	Pend S	Y		S,T
	T.h. forsteni		Sumbawa (Indonesia)	?	3	D?	Is	V	T,Hy	Pend S	Y		S,T
	T.h. djampeanus		Tanahjampea (Indonesia)	<5,000	4	D/S	Is	V	T,L,Hy	Pend S	Y		S,T

SCIENTIFIC NAME			WILD POPULATION STATUS							RECOMMENDATIONS			
GENUS	SPECIES / SUBSP.	SS	WORLD RANGE	POPULATION SIZE EST.	DATA QUAL.	POP. TREND	AREA OF RANGE	M/L	THRTS	WORK-SHOP	*IN SITU*	RECO-VERY	T/S/H
	T.h. flavotectus		Wetar, Roma (Indonesia)		4	D?	Is	S?	L,T				S,T
	T.h stresemanni		Kalao Tua (Indonesia)		4	D?	Is	V?	L,T	Pend S	Y		S,T
	T.h. weberi		Flores (Indonesia)	>20,000	3	D?	Is	S?	T,Hy	Pend S	Y		S,T
	T.h. capistratus		Timor (Indonesia	>10,000	3	D?	Is	S?	T,Hy	Y	Y		S,T
	T.h. rosenbergii		Biak (Indonesia)	10,000±	2	D?	Is	V	T,Hy	Pend S	Y		S
Trichoglossus	*rubiginosus*		Pohnpei Is. (Caroline Is.)	>10,000	2	S	Is	S					S
Trichoglossus	*johnstoniae*	2	Mindanao (Philippines)	<10,000	3	D?	Is	V	L?	Pend S	Y		S
Trichoglossus	*flavoviridis*	2	Indonesia		-		C						
	T.flavoviridis		Sula Is.	>10,000	2	D?	Is	S?	L,t				S
	T.f. meyeri		Sulawesi	>100,000	3	S	C	S	T				
Trichoglossus	*chlorolepidotus*		Australia	>100,000	2	S	C	S	N				
Trichoglossus	*euteles*		Lesser Sunda Is. (Indonesia)	>50,000	3	S->D?	Is	S?	L,T		Y?		S
Trichoglossus	*versicolor*		northern Australia	>100,000	2	S	D	S	N				
Trichoglossus	*iris*	2	Wetar, Timor (Indonesia)	10,000±	3	D?	Is	S/V?	L,T				S
Trichoglossus	*goldiei*		Irian Jaya (Indonesia), PNG	>>100,000	3	S	C	S	L,t				
Lorius	*hypoinochrous*	3	eastern PNG, Bismarck Arch., Louisiade Arch., D'Entrecasteaux, Trobriand Is., Woodlark Is.	>50,000	3	S?	B	S	L,N				T,S
Lorius	*lory*	7	Irian Jaya (Indonesia), PNG	>>100,000	3	S	C	S	T,Hy				
	L.l. cyanauchen		Biak (Indonesia)	<5,000	3	D	Is	V	L,T, Hy?	Pend S	Pend S		S
Lorius	*albidinuchus*		New Ireland (PNG)	1,000-10,000	3	S->D	Is	V	L,t				S
Lorius	*chlorocercus*		Solomon Is.	10,000-50,000	2	S->D	Is	V	L,t		Y		S
Lorius	*domicellus*		Seram, Ambon? (Indonesia)	2,000-20,000	3	D	Is	E	L,T	Pend S	Y		S
Lorius	*garrulus*	3	Indonesia				Is						
	L.g garrulus		Halmahera/Widi	>30,000	2	D	Is	E	T,Hy	Y	Y		T
	L.g flavopalliatus		Bacan/Obi	>11,000	1	D	Is	E	T,Hy	Y	Y		T

SCIENTIFIC NAME			WILD POPULATION STATUS								RECOMMENDATIONS			
GENUS	SPECIES / SUBSP.	SS	WORLD RANGE	POPULATION SIZE EST.	DATA QUAL.	POP. TREND	AREA OF RANGE	M/L	THRTS		WORK-SHOP	*IN SITU*	RECO-VERY	T/S/H
	L.g. morotaiana		Morotai/Rau	>4,000	4	D	Is	E	T,Hy		Pend S	Y		T,S
Phigys	*solitarius*		Fiji Is.	10,000-100,000	3	S	Is	S						S
Vini	*australis*		Tonga, Samoa, Fiji Is., Niue, Wallis Is, Futuna Is	50,000-100,000	1/3	D	Is	V/S	P-rats					
Vini	*kuhlii*		Tubuai Is. (France), [Kiribati]	1,500-2,200	2	D?	Is	E	P-rats			Y		
Vini	*stephani*		Henderson Is. (UK)	500-1,000	2	S?	Is	E	P?,L?			Y?		
Vini	*peruviana*		Society Is. and Tuamotu Is. (France) [Cook Is.]	1,500-4,000	1/3	S?	Is	E	P-rats			Y		
Vini	*ultramarina*		Marquesas Is. (France)	1,000-1,500	1	D	Is	C	P-rats				Y	
Glossopsitta	*concinna*		south-east Australia	>100,000	2	S	D	S						
Glossopsitta	*pusilla*		south-east Australia	>100,000	2	S	D	S						
Glossopsitta	*porphyrocephala*		southern Australia	>50,000	2	S	D	S						
Charmosyna	*palmarum*		Vanuatu, Duff, Santa Cruz, Banks (Solomon Is.)	>50,000	3	S?	Is	S						
Charmosyna	*rubrigularis*		Bismarck Arch. (PNG)	>10,000	4	S?	B	S?	L					S
Charmosyna	*meeki*		Solomon Is., Bougainville (PNG)	>>50,000	4	S?	Is	S						
Charmosyna	*toxopei*		Buru (Indonesia)	?	2	S?	Is	V/S?						S
Charmosyna	*multistriata*		Irian Jaya (Indonesia), PNG	>10,000	3	S?	B	S?	?					
Charmosyna	*wilhelminae*		Irian Jaya (Indonesia), PNG	>50,000	3	S	C	S	?					
Charmosyna	*rubronotata*	2	Irian Jaya (Indonesia), PNG	>100,000	3	S	C	S	?					
Charmosyna	*placentis*	5	eastern Indonesia, PNG, Bismarck Arch.	>500,000	2/3/4	S	D	S	H,s					
Charmosyna	*diadema*		New Caledonia (France)	Extinct?	2	?	Is	C/Ex	L,P?					S
Charmosyna	*amabilis*		Fiji Is.	>10,000	3	S?	Is	V	L,C?					S
Charmosyna	*margarethae*		Solomon Is., Bougainville (PNG)	>50,000	3	S	Is	S						S
Charmosyna	*pulchella*	2	Irian Jaya (Indonesia), PNG	>500,000	3/4	S	C	S						
Charmosyna	*josefinae*	2	Irian Jaya (Indonesia), PNG	>300,000	3/4	S	C	S						
Charmosyna	*papou*	4	Irian Jaya (Indonesia), PNG	>500,000	3/4	S	C	S	T,H					
Oreopsittacus	*arfaki*	3	Irian Jaya (Indonesia), PNG	>300,000	3/4	S	C	S						

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Neopsittacus	*muschenbroekii*	3	Irian Jaya (Indonesia), PNG	>300,000	3/4	S	C	S					
Neopsittacus	*pullicauda*	3	Irian Jaya (Indonesia), PNG	>300,000	3/4	S	C	S					
CACATUIDAE													
Cacatuinae													
Probosciger	*a. aterrimus*	3	Misool, Aru Is., south New Guinea (Indonesia, PNG), north Australia	>>10,000	2/3	S/D	D	S/V	L,T,H?	Pend S	Pend S		T
	P.a. goliath, stenolophus		west Papuan Is., Japen Is., New Guinea (Indonesia, PNG)	>20,000	3/4	S/D	B	S/V	T	Pend S	Pend S		T
Calyptorhynchus	*baudinii*		western Australia	>1,000	2	D	A	V/S?	L?,H?		Y		
Calyptorhynchus	*funereus*	2	south-east Australia	>20,000	1/2	S	D	S	L?				T
Calyptorhynchus	*latirostris*		western Australia	<10,000	2	D	B	V	L		Y		
Calyptorhynchus	*banksii (= magnificus)*	4	Australia	>100,000	1/2	S	E	S	?				
Calyptorhynchus	*lathami*		Australia	>5,000	2	S	C	S/V	L		Y		
Callocephalon	*fimbriatum*		Tasmania, Australia	>20,000	1/2	D	C	S?	L,t		Y		
Eolophus	*roseicapillus*	3	Australia	>5,000,000	1/2	I	E	S					
Cacatua	*leadbeateri*	2	Australia	<20,000	1/3	D	E	S	L,H,t	Y	Y		S,T
Cacatua	*sulphurea*	4	Indonesia										
	C.s.sulphurea		Sulawesi & satellite islands	<10,000	3/4	D	C	E	T	Pend S	Y		T?,S
	C.s.citrinocristata		Sumba	800-7,200	1	D	Is	C	T, L	Y	Y		T
	C.s.parvula		Lesser Sundas	<10,000	3/4	D	Is	E	T	Pend S	Y		T,S
	C.s.abbotti (valid?)		Salombu Besar	?	4	?	Is	E?	T	Pend S			T,S
Cacatua	*galerita*	4	Indonesia, Papua New Guinea, Australia, Tasmania, [New Zealand, Palau Is.]	>500,000	2/3/4	S	E	S	t				
	C.g.eleonora		Aru Is [Kai is] (Indonesia)	50,000	3	D	Is	V?	T	Y	Y		S
Cacatua	*ophthalmica*		Bismarck Arch (PNG)	>5,000	3	?	Is	S?	L, t	Pend S	Pend S		S
Cacatua	*moluccensis*		Seram, Separu, Haruku, Ambon (Indonesia)	>8,000	2	D	Is	E/C	T	Y	Y		S,H

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Cacatua	*alba*		Bacan, Halmahera, Ternate, Kasiruta, Tidore, Mandiole (Indonesia)	>50,000	1/3	D	Is	E	H,T,L	Y	Y		S,H
Cacatua	*haematuropygia*		Philippines	1,000-4,000	1/2	D	C	C	T,D,L	Y	Y		S,H
Cacatua	*goffini*		Tanimber Is. [Tual] (Indonesia)	>5,000	4	D	Is	E/C?	T	Pend S	Y		S
Cacatua	*pastinator*	2?	Australia										
	p.butleri		Australia	?	3		B	S					T
	p.pastinator		south-west Australia	1,500	1	I	A	V	H				
Cacatua	*sanguinea*	3	Australia, south Irian Jaya (Indonesia), Papua New Guinea	>1,000,000	1/3	S-I	E	S	T				
Cacatua	*tenuirostris*		south-east Australia	>50,000	1	S?	C	S	H		Y		
Cacatua	*ducorpsii*		Bougainville (PNG), Solomon Is.	>100,000	2/3	S/D	Is	S	T				
Nymphicinae													
Nymphicus	*hollandicus*		Australia	>1,000,000	2	S	E	S					
PSITTACIDAE													
Nestorinae													
Nestor	*notabilis*		south New Zealand	1,000-5,000	2	D	B	V	H		Y		H
Nestor	*meridionalis*	2	New Zealand	<5,000	1	D	B	E	P,L,C		Y		H
Micropsittinae													
Micropsitta	*pusio*	4	Irian Jaya (Indonesia), PNG, Bismarck Arch.	>>100,000	4	S	C	S					S
Micropsitta	*keiensis*	3	Kai Is., Aru Is. Irian Jaya (Indonesia)	>>100,000	4	S	C	S					T,S
Micropsitta	*geelvinkiana*	2	Numfor, Biak (Indonesia)	10,000+	4	S	Is	S	L				T,S
Micropsitta	*meeki*	2	Bismarck Arch. (PNG)	>10,000	4	S	Is	S					T
Micropsitta	*finschii*	5	Bismarck Arch. (PNG), Solomon Is.	>>100,000	4	S	B	S					T,S
Micropsitta	*bruijnii*	4	Buru, Seram, Irian Jaya (Indonesia) PNG, Bismarck Arch. (PNG), Solomon Is.	>>100,000	4	S	C	S					T,S
Psittacinae													

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Cyclopsitta	*gulielmitertii*	7	Aru Is., Irian Jaya (Indonesia), PNG	>100,000	3/4	S	C	S	?				T,H
Cyclopsitta	*diophthalma*	8	Aru Is., Irian Jaya (Indonesia), PNG, Australia	>100,000	3/4	S	D	S					T
	C.d.macleyana		north-east Australia	5,000±	2	D?	A	V/S	?		Y		S
	C.d.coxeni		south-east Australia	<200	1	D	A	C	L			Y	T
Psittaculirostris	*desmarestii*	6	Irian Jaya (Indonesia), PNG										
	P.d. sspp. western	4	Irian Jaya (Indonesia)	>100,000	3	D	B	S?	T,L	Pend S	Pend S		H,T,S
	P.d. sspp. eastern	2	south New Guinea (Indonesia, PNG)	>50,000	3	S	B	S	N				T
Psittaculirostris	*edwardsii*		Irian Jaya (Indonesia), PNG	>100,000	3	S	B	S					
Psittaculirostris	*salvadorii*		Irian Jaya (Indonesia)	>10,000	3	D	A	V	T	Y	Pend S		S
Bolbopsittacus	*lunulatus*	4	Philippines	50,000±	3	S?	C	S?	?				S
Psittinus	*cyanurus*	3	Burma, Thailand, Malaysia, Greater Sunda Is. (Indonesia)	>100,000	3	S->D	E	S	L				T,S
	P.c.abbotti		Simelue & Siumat Is. (Indonesia)	?<5,000	4	D?	Is	V?	L	Pend S	Pend S		T,S
Psittacella	*brehmii*	4	Irian Jaya (Indonesia), PNG	>100,000	4	S	C	S					
Psittacella	*picta*	3	Irian Jaya (Indonesia), PNG	>100,000	4	S	C	S					
Psittacella	*modesta*	3	Irian Jaya (Indonesia), PNG	>50,000	4	S	C	S					
Psittacella	*madaraszi*	4	Irian Jaya (Indonesia), PNG	>50,000	4	S	B	S					
Geoffroyus	*geoffroyi*	15	Indonesia, Papua New Guinea, north Australia	>1,000,000	2/3/4	S	D	S	t				T
Geoffroyus	*simplex*	2	Irian Jaya (Indonesia), Papua New Guinea	50,000±	4	S	C	S					
Geoffroyus	*heteroclitus*	2	Bismarck Arch. (PNG), Solomon Is.				B						
	G.h.heteroclitus		Bismarck Arch. (PNG), Solomon Is.	<100,000	3/4	S	B	S					
	G.h.hyacinthinus		Rennell Is. (Solomon Is.)	5,000-20,000	4	S	Is	V	L?				T,S
Prioniturus	*luconensis*		Luzon, Marinduque (Philippines)	10,000±	3	D	B	E/V	L,T	Pend S	Pend S		S
Prioniturus	*discurus*	4	Philippines	10,000±	3	D	C	E/V?	L,T	Pend S	Pend S		T,S
Prioniturus	*platenae*		Palawan, Balabac (Philippines)	10,000±	3	D	Is	V?	L,T	Pend S	Pend S		S

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Prioniturus	*montanus*		Luzon (Philippines)	<10,000	3	D	A	V	L,T	Pend S	Pend S		S,T
Prioniturus	*verticalis*		Sulu Is. (Philppines)	<5,000	3	D	Is	E	L,T	Pend S	Y		S,T
Prioniturus	*waterstradti*	2	Mindanao (Philippines)	5,000+	3	D	A	E?	L,T	Pend S	Y		H,S,T
Prioniturus	*flavicans*		Sulawesi & satellite islands (Indonesia)	<10,000	3	D?	B	V?	t/L	Pend S	Pend S		S
Prioniturus	*platurus*	3	Indonesia				C						
	P.p.platurus		Sulawesi & satellite islands	>10,000	3	S	C	S	?				T
	P.p.talautensis		Talaud	5,000+	3	S?	Is	V	?	Pend S	Pend S		T,S
	P.p.sinerubris		Taliabu	10,000+	3	S?	Is	S?	t				T,S
Prioniturus	*mada*		Buru (Indonesia)	>300,000	2	S	Is	S					S
Tanygnathus	*megalorynchos*	5	Indonesia, Philippines	>100,000	2/3	D-loc	Is	V/S	T,L		Y		S,T
	T.m. kellmayri		western Timor, Samao (Indonesia)	?	3	D?	Is	E/V	L,t		Pend S		S
Tanygnathus	*lucionensis*	3	Talaud, Marsua Is. (Indonesia), Philippines, north Bomean Islands (Malaysia)	<10,000	2/3	D	C	E	L		Y		H,S
Tanygnathus	*sumatranus*	5	Sulawesi, Sula Is. (Indonesia), Philippines	50,000+	3	D-loc	C	S	T?				
Tanygnathus	*heterurus* (Valid?)		Sulawesi (Indonesia) ??										T
Tanygnathus	*gramineus*		Buru (Indonesia)	5,000+	4	S?	Is	E/S?	t,L?	Pend S	Pend S		S
Eclectus	*roratus*	10	Indonesia, Papua New Guinea, Australia, Solomon Is. [Palau Is.]	>300,000	2/3	S	D	S					
	E.r.vosmaeri		north Moluccas (Indonesia)	>80,000	2/3	D?	Is	S/V	T	Y	Y		T
	E.r.cornelia		Sumba (Indonesia)	>20,000	1	D	Is	E	T/L	Y	Y		
	E.r.riedeli		Tanimbar Is. (Indonesia)	?	4	D?	Is	V/E	t/L	Pend S	Y		S
Psittrichas	*fulgidus*		Irian Jaya (Indonesia), PNG	>10,000	3	D	C	V	L,H,t				S
Prosopeia	*tabuensis*	2	Fiji Is.				Is						
	P.t.tabuensis		Vanua, Levu, Kioa, Koro Gau (Fiji Is.); Eua, [Tongatabu?] (Tonga Is.)	>20,000	1/3	S/D	Is	S	t		Y		
	P.t.taveunuensis		Taveuni, Qamea, Laucala (Fiji)	>5,000	3	S?	Is	V	t,L		Y		S

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Prosopeia	*splendens*		Kandavu (Fiji)	5,000-10,000	3	S?	Is	V	t		Y		S
Prosopeia	*personata*		Viti Levu (Fiji Is.)	>5,000	2	S	Is	S?	L,C?		Y		S
Alisterus	*scapularis*	2	east Australia	>50,000	1	S	C	S	t,L				
Alisterus	*chloropterus*	3	New Guinea (Indonesia, PNG)	50,000±	3	S?	C	S	t				
	A.c.moszkowskii		Irian Jaya (Indonesia)	20,000±	3	S/D?	B	S?	T		Y		T,S
Alisterus	*amboinensis*	6	Indonesia				C						
	A.a.amboinensis		Ambon, Seram	>10,000	2	D	B	V	T,L	Y	Y		T,S
	A.a.sulaensis		Sula Is.	≤5,000	2	D	Is	V	t,L	Y	Y		T,S
	A.a.versicolor		Peleng Is.	≤5,000	3	D	Is	V	T,L	Pend S	Pend S		T,S
	A.a.buruensis		Buru	>10,000	1	D	Is	V	T,L	Y	Y		T,S
	A.a.hypophonius		Halmahera	>15,000	3	D	B	V/E	L	Y	Y		T,S,H
	A.a.dorsalis		Irian Jaya & west Papuan Islands	>15,000	3	S?	C	S	t	Y	Y		T,S
Aprosmictus	*erythropterus*	2	Australia, south New Guinea (Indonesia, PNG)	>>100,000	2	S	E	S	L				
Aprosmictus	*jonquillaceus*	2	Timor, Wetar, Roti (Indonesia)	10,000±	3	S->D	Is	V/S	t		Pend S		T,S
Polytelis	*swainsonii*		south-east Australia	10,000±	1	D	B	V	L,T?		Y		
Polytelis	*anthopeplus*	2	Australia				D						T
	P.a.anthopeplus		south-east Australia	<5,000	1	D	A	V	L,C,S?		Y		
	P.a.westralis		south-west Australia	>10,000	2	S?	B	S	?				
Polytelis	*alexandrae*		central-west Australia	1,000-20,000	4	D	E	V/S	T?,F?,P?	Y	Y		S
Purpureicephalus	*spurius*		south-west Australia	>20,000	2	S	C	S	?				
Barnardius	*barnardi*	3	Australia	>100,000	2	S	E	S	?				
Barnardius	*zonarius*	3	western Australia	>500,000	2	S->I	E	S	N				
Platycercus	*caledonicus*		Bass St., Tasmania (Australia)	>50,000	2	S	B	S					
Platycercus	*elegans*	3	east Australia, [New Zealand]	>200,000	2	S	C	S					
Platycercus	*flaveolus*		south-east Australia	>50,000	2	S	B	S					

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Platycercus	*adelaidae*		south Australia	>50,000	2	S	A	S					
Platycercus	*eximius*	3	east Australia, Tasmania [New Zealand]	>500,000	2	=>S->I	D	S					
Platycercus	*adscitus*	2	east Australia	>100,000	2	S	D	S					
Platycercus	*venustus*		north Australia	<50,000	2	S->D?	C	S					
Platycercus	*icterotis*	2	west Australia	>100,000	2	S	C	S					
Psephotus	*haematonotus*	2	south-east Australia	>200,000	2	S	E	S					
Psephotus	*varius*		south & central Australia	>100,000	2	S	E	S					
Psephotus	*haematogaster*	4	south Australia	>100,000	2	S	E	S					
	P.h. narethae		Nullabor Plain, W. Australia	<5,000?	3	S?	A	S/V	L,t				S
Psephotus	*chrysopterygius*		north Australia	<500	1/2	D	B	E	T,L,F?,P?	Y	Y		
Psephotus	*dissimilis*		north Australia	>15,000	2	S	B	S	L,T	Y	Y		
Psephotus	*pulcherrimus*		east Australia	Extinct?	4		C	Ex/C	L				S?
Cyanoramphus	*unicolor*		Antipodes Is. (New Zealand)	2500	1	S	Is	V			Y		
Cyanoramphus	*novaezelandiae*	5	New Zealand, New Caledonia (France)	>15,000	1/2	D	B	V?	L,P,Hy		Y		T
	C.n.cookii		Norfolk Is. (Australia)	40	1	I	Is	C	L,P			Y	T
	C.n. chathamensis		Rangatira (New Zealand)	<1,000	1	D?	Is	V	L				S
Cyanoramphus	*auriceps*	2	New Zealand										
	C.a.auriceps		New Zealand	>5,000	1/2	D	B	V	L,P		Y		
	C.a.forbesi		Chatham Island (New Zealand)	350	1	I	Is	E	L,C,Hy	?		Y	
Cyanoramphus	*malherbi (valid?)*		New Zealand	<5,000		D?	A	V	?		Pend T		T
Eunymphicus	*cornutus*	2	New Caledonia and Loyalty Is. (France)				Is						
	E.c.cornutus		New Caledonia	2,000-10,000	2	S?	Is	V/S	t				S
	E.c.uvaeensis		Ouvéa / Loyalty Isl	<200	3	D?	Is	C	T,L,H	Y		Y	S
Neophema	*bourkii*		Australia	>50,000	3	S	E	S					
Neophema	*chrysostoma*		south-east Australia	>20,000	2	S	E	S					

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GENUS	SPECIES / SUBSP.	SS	WORLD RANGE	POPULATION SIZE EST.	DATA QUAL.	POP. TREND	AREA OF RANGE	M/L	THRTS	WORK-SHOP	*IN SITU*	RECO-VERY	T/S/H
Neophema	*elegans*		south & west Australia	>30,000	2	I	D	S					
Neophema	*petrophila*		south & west Australia	>20,000	2	S	C	S					
Neophema	*chrysogaster*		south Australia, Tasmania	150	1	S	B	C	F,L,T?			Y	
Neophema	*pulchella*		east Australia	>20,000	2	I	C	S	?		?		
Neophema	*splendida*		south Australia	>5,000	2	S?	E	S?	T	?	?		
Lathamus	*discolor*		south-east & east Australia, Tasmania	5000±	1	D	D	V	L,T?	?	Y		
Melopsittacus	*undulatus*		Australia	5,000,000	2	S	E	S					
Pezoporus	*wallicus*	2	Australia										
	P.w.wallicus		Australia, Tasmania	>100,000	2	S	B	S	L	?	Y		S
	P.w.flaviventris		south-west Australia	<450	1	D	A	E	L,F,P?	Y	Y		H
Geopsittacus	*occidentalis*		Australia	??	4	?	E	E?	P?,F?	?	Y		S
Coracopsis	*vasa*	3	Madagascar, Comoro Is.				C						
	C.v. Madagascar sspp.	2	Madagascar	50,000±	3	D	C	V/S	L		Y		
	C.v. comorensis		Comoro Is.	>3,000	3	D	Is	V/S	L		Y		S
Coracopsis	*nigra*	4	Madagascar, Comoros Is., Seychelles				C						
	C.n. Madagascar sspp	2	Madagascar	30,000±	3	S->D	C	S	L		Y		
	C.n.sibilans		Comoro Isls	3,000-5,000	3	S->D	Is	V/S	L		Y		S,T
	C.n.barklyi		Praslin (Seychelles)	100±	1	S	Is	E	L?,C?	Y	Y		T
Psittacus	*erithacus*	3	west to central Africa				E						
	P.e.erithacus		Cote d'Ivoire to Uganda and Angola	500,000±	1/3	D	E	S?	T		Y		
	P.e.timneh		Guinea Bissau to Cote d'Ivoire	100,000±	3	D	B	S/V	T		Y		
Poicephalus	*robustus*		south Africa	1,000-4,000	1/3	D	A	E	T/H	Y	Y		T
Poicephalus	*fuscicollis*	2	south and west Africa	>10,000	3	S	D	S	t				T
Poicephalus	*gulielmi*	4	central & west Africa	>100,000	3	S	E	S	T				
Poicephalus	*cryptoxanthus*	3	south-east Africa	>100,000	3	S	D	S	T				

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Poicephalus	*crassus*		CAP, Chad, Sudan, Zaire	>50,000	4	S	C	S					
Poicephalus	*senegalus*	3	central-west & west Africa	>200,000	3-	S	E	S/V	T		Y		
Poicephalus	*rufiventris*	2	north-east Africa	>50,000	3	S?	E	S?	T		Y		
Poicephalus	*meyeri*	6	central & east Africa [south Africa]	>100,000	3	S	E	S	T		Y		
Poicephalus	*rueppellii*		Angola, Namibia	50,000+	3	S	C	S	t				
Poicephalus	*flavifrons*	2	Ethiopia	20,000+	4	D/S	C	S	L?				S
Agapornis	*canus*	2	Madagascar [various Indian Ocean Is.]	1,000,000	3	S	C	S	T				
Agapornis	*pullarius*	2	central and central-west Africa	>1,000,000	3	S	E	S					
Agapornis	*taranta*		Ethiopia	<100,000	3	S	C	S					
Agapornis	*swindernianus*	3	west and central Africa				D						T
	A.s.swindernianus		Liberia, Ghana, Cote d'Ivoire	?	4	D	B	E?	H?				S
	A.s.zenkeri + emini		Cameroon, CAP, Congo, Gabon, Uganda, Zaire	>100,000	4	S	D	S					
Agapornis	*roseicollis*	2	S.W. Africa	>50,000	2/3	D	E	S?	?		Y		S
Agapornis	*fischeri*		Tanzania ?Rwanda/Burundi [Kenya]	<50,000	2	D	B	E	T,Hy	Pend S	Y		S
Agapornis	*personata*		Tanzania [Kenya]	>100,000	3	S	B	S	t,Hy		Y		
Agapornis	*lilianae*		Malawi, Tanzania, Zambia, Zimbabwe, Mozambique	<50,000	3	D	B	V	H,t		Y		S
Agapornis	*nigrigenis*		Zambia, Namibia, (?Zimbabwe)	<10,000	3	D?	A	E	Hy,T,L?	Pend S	Y		S
Loriculus	*vernalis*		Indian subcontinent, Burma, Thailand, Indochina, s China,	>1,000,000	3	S	E	S	?				
Loriculus	*beryllinus*		Sri Lanka	>10,000	3	S	B	S	t?				S
Loriculus	*philippensis*	10	Philippines	>20,000	3/4	D	C	V/S	L				T,S
	L.p.chrysonotus		Cebu	?>50/Ext	3	Ex?	Is	C/Ex	L,Hy	Pend S		Pend S	T,S
	L.p.siquijorensis		Siquijor Isl	>100	3	D	Is	C	L, Hy?		Pend S		T,S

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GENUS	SPECIES / SUBSP.	SS	WORLD RANGE	POPULATION SIZE EST.	DATA QUAL.	POP. TREND	AREA OF RANGE	M/L			WORK-SHOP	*IN SITU*	RECO-VERY	T/S/H
	L.p.minderanensis *L.p.bournsi* *L.p.panayensis* *L.p.regulus* *L.p.dohertyi*		Various Philippine Is.	<5000	3/4	D	Is	E/V	L, Hy?		Pend S	Pend S		T,S
Loriculus	*galgulus*		Thailand, Malaysia, Singapore, Greater Sunda IS. (Indonesia)	>100,000	3/4	S->D?	E	S	T			Y		
Loriculus	*stigmatus*	3	Sulawesi, Togian, Muna, Buting (Indonesia)	>100,000	3/4	S?	C	S	t					
Loriculus	*amabilis*		Halmahera, Bacan (Indonesia)	>20,000	4	S?	Is	S	t,L					
Loriculus	*sclateri*	2	Indonesia											
	L.s.sclateri		Sula Is.	>5,000	3	S?	Is	S	L					T
	L.s.ruber		Banggai, Peleng	?	3	?	Is	V?	L					T,S
Loriculus	*catamene*		Sangihe Is. (Indonesia)	Ext?	3	?	Is	Ext/C	L		Pend S	Pend S	Pend S	S
Loriculus	*exilis*		Sulawesi (Indonesia)	>10,000	3	S?	B	S?						S
Loriculus	*flosculus*		Flores (Indonesia)	?	3	E?	Is	E/V			Pend S	Pend S		S
Loriculus	*pusillus*		Java, Bali (Indonesia)	>10,000	3	S?	B	S						S
Loriculus	*auraniifrons*	3	Irian Jaya (Indonesia), PNG	>100,000	4	S	C	S						
Loriculus	*tener*		Bismarck Arch. (PNG)	?	4	S/D?	Is	S?	?		Pend S	Pend S		S,T
Psittacula	*eupatria*	5	Afghanistan to Indochina				E							
	P.e.sspp	4	mainland and Sri Lanka subspecies	>200,000	3	S	E	S	L(Loc)					
	P.e.magnirostris		Andaman Is.	<5000	4	S?	Is	V?	L?			?		S,T
Psittacula	*krameri*	4	C. & N.E. Africa, Afghanistan to Burma	>5,000,000	3	S/I	E	S						
Psittacula	*eques*		Mauritius (formerly Réunion)	15-20	1	S?	Is	C	L/C		Y		Y	H
Psittacula	*himalayana*		Afghanistan to India, Nepal	>80,000	3/4	S	D	S	L?					
Psittacula	*finschii*		north-east India to Indochina and China	>70,000	3/4	S	D	S	L?					
Psittacula	*cyanocephala*	2	Sri Lanka, India, Pakistan, Nepal, Bangladesh	>100,000	3	S	E	S						
Psittacula	*roseata*	2	India to Indochina	>100,000	3/4	S/D	E	S	T/L?					

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Psittacula	*intermedia* (Valid?)		India ?	?	4		C?		t				T,S
Psittacula	*columboides*		west and south India	10,000±	3	D	B	V	L/T		Pend S		S
Psittacula	*calthropae*		Sri Lanka	5,000-10,000	3	D	B	V	L/T		Pend S		S
Psittacula	*derbiana*		China, India	5,000-50,000	3/4	D	C	V?	T/L		Pend S		S
Psittacula	*alexandri*	8	India to Indonesia										
	P.a.fasciata		India to s China, Indochina, Thailand	>1,000,000	3/4	S	E	S	t				
	P.a.alexandri		Java, Bali (Indonesia)	10,000±	3	D	B	V	T	Pend S	Y		S
	P.alexandri other Is sspp.	6	Andamans and various Indonesian Islands	?	3/4		Is	V?	?		Pend S		T,S
Psittacula	*caniceps*		Nicobar Is. (India)	1000±	3	S/D?	Is	V	(L)	Pend S	Pend S		S
Psittacula	*longicauda*	5	Thailand to Indonesia, Nicobar Is. and Andaman Is. (India)				E						
	P.l.longicauda		Thailand to Indonesia	>100,000	3/4	S	E	S	T		Y		
	P.l. island sspp	4	Andamans, Nicobars, Enggano, Natuna, Riau	>5,000	3/4	S?	Is	S?	t				T,S
Anodorhynchus	*hyacinthinus*		Brazil, Bolivia, Paraguay	5,000-10,000	1/3	D	D	E	H,T,L	Y	Y		S,H
Anodorhynchus	*glaucus*		Paraguay, Argentina, Uruguay, Brazil- Extinct?	0-100	4	D	A	C/Ex?	L,T	Pend S		Pend S	S
Anodorhynchus	*leari*		Brazil	70	1	D	A	C	L,T,H			Y	S,H
Cyanopsitta	*spixii*		Brazil	17	1	D	A	C	L,H,T			Y	S,H
Ara	*ararauna*		Panama to central South America	>100,000	2/3	D	E	S	L,T				
Ara	*glaucogularis*		Bolivia (?n Paraguay, n Argentina)	<1,000	2	?	A	V	T	Pend S	Pend S		S
Ara	*militaris*												
	A.m.militaris		Venezuela, Ecuador, Colombia, Peru	5,000±	3	D?	B	S/V	t,L				S,T
	A.m.boliviana		Bolivia, ?northern Argentina	<5,000	4	D	A	V/S	t,L				S,T
	A.m.mexicana		Mexico, [Guatemala]	<5,000	3	D	B	V/E	T,L		Y		S,T
Ara	*ambigua*		Honduras to Colombia, Ecuador	5,000±	3	D	B	V/E	L, T	Y	Y		T,S
Ara	*macao*		Mexico to Colombia, north-east South America	>100,000	3	D	E	V/S	T,L,H	Y	Y		S,T

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Ara	*chloroptera*		Panama, north-east to east-central South America	>100,000	3	D	E	S	T,L				
Ara	*rubrogenys*		Bolivia	2,000-5,000	1/2	D	A	V	L,T	Y	Y		
Ara	*auricollis*		Brazil, Bolivia, Paraguay, Argentina	10,000	4	?	D	S	?				S
Ara	*severa*	2	Panama to Guianas, Brazil, Bolivia	>100,000	3/4	S	E	S					
Ara	*manilata*		Trinidad, northern South America	>100,000	3/4	S	E	S	t?				
Ara	*maracana*		Brazil, Paraguay, Argentina	<10,000	3	S	E?	V	L		Y		S
Ara	*couloni*		Peru, Bolivia, west Brazil	10,000+	3	S	B	S	t				S
Ara	*nobilis*	3	Guianas, Venezuela, Brazil, north Bolivia, south-east Peru	>100,000	3	S	E	S					
Guaruba	*guarouba*		north-east Brazil	<5,000	3	D	C	V	L,T,H	Y	Y		S
Aratinga	*acuticaudata*	4	north to central South America	>100,000	3/4	S	E	S	T				T
	A.a.neoxena (valid?)		Margarita Is (Venezuela)	<200	2	S	Is	C/E	L		Y		S,T
Aratinga	*holochlora*	3	Mexico to Nicaragua	>100,000	3	S	C	S	L				
Aratinga	*rubritorquis*		Guatemala to Nicaragua	>10,000	3	D	B	S?	L,T				T
Aratinga	*brevipes*		Mexico	<500	1	S	Is	V	P?		Y		T,S
Aratinga	*finschi*		Nicaragua, Costa Rica, Panama	>50,000	3	S?	B	S					
Aratinga	*wagleri*	4	N.W. South America	>100,000	3/4	S	E	S					
Aratinga	*mitrata*	2	Peru, Bolivia, Argentina										
	A.m.mitrata		Peru, Bolivia, Argentina	>100,000	3/4	S?	D	S	T				S,T
	A.m.alticola		Cusco (central Peru)	?	4	?	A	V?	?		?		T,S
Aratinga	*erythrogenys*		west Ecuador, north-west Peru	>50,000	2/3	D	B	V/S	T				S
Aratinga	*leucophthalmus*	3	N. to C. South America	>100,000	3/4	S	IE	S	t				
Aratinga	*chloroptera*		Haiti, Dominican Republic	<5,000	3	D	B	V	L	Pend S	Y		S
Aratinga	*euops*		Cuba	<5,000	3	D	B	V	L,T	Pend S	Y		S
Aratinga	*auricapilla*	2	Brazil	<5,000	3	D	E	V	L,T	Pend S	Y		T,S

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Aratinga	*jandaya*		Brazil	>50,000	3/4	?	E	S					S
Aratinga	*solstitialis*		Guianas, Venezuela, Brazil	>100,000	3/4	D	E	S					
Aratinga	*weddellii*		N.W. South America	>100,000	3/4	S	E	S					
Aratinga	*nana*	3	Jamaica, Mexico to Panama				C						
	A.n.nana		Jamaica	<10,000	3	D	Is	V	L	Pend S	Y		T,S
	A.n.astec/vicinalis		Mexico->Panama	>100,000	3/4	S	C	S					T
Aratinga	*canicularis*	3	Mexico to Costa Rica	>100,000	3/4	S	C	S					
Aratinga	*pertinax*	14	Panama, N. South America	>1,000,000	3/4	I	E	S					T
Aratinga	*cactorum*	2	Brazil	>100,000	3	S	D	S					
Aratinga	*aurea*	2?	Suriname, Brazil, Bolivia, Paraguay, Argentina	<1,000,000	3	D	E	S					
Nandayus	*nenday*		Argentina, Brazil, Paraguay	>100,000	3	S	E	S					
Leptosittaca	*branickii*		Colombia, Ecuador, Peru	>1000	2/3	D	B	E	L	Pend S	Y		S
Ognorhynchus	*icterotis*		Colombia, north Ecuador	<50	3	D	A	C	L,i,H	Pend S		Y	S
Rhynchopsitta	*pachyrhyncha*		Mexico [USA]	<5000	3	D	B	E/V	T,L	Y	Y		S,H
Rhynchopsitta	*terrisi*		Mexico	2000+	2/3	D	A	E	L	Y	Y		S
Cyanoliseus	*patagonus*	3	Argentina, Uruguay, Chile	>100,000	3	S?	E	S	T?,S?				
	C.p.byroni		Chile	<3000	2	S	A	V	H		Y		T
Pyrrhura	*cruentata*		Brazil	<2500	3	S?	A	V	PL,i	Y	Y		S
Pyrrhura	*devillei* (valid?)		central Brazil	?		D?	B	S?	L,i				T,S
Pyrrhura	*frontalis*	3	Brazil, Paraguay, Uruguay, Argentina	>1,000,000	3	S	E	S					
Pyrrhura	*perlata*	4	Brazil										T
	P.p.perlata		central Brazil	>100,000	3	S	D/C	S					
	P.p.lepida		north-east Brazil	>10,000	3	D	B	S?	L		Y		S
	P.p.anerythra		central Brazil	>10,000	3	D	B	S?	L		Y		S
	P.p.coerulescens		north-east Brazil	?Extinct	3	?	A	Ex/C	L	Pend S	Pend S		S

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Pyrrhura	*molinae*	5	Brazil, Bolivia, Argentina	>100,000	3/4	S	D	S						
Pyrrhura	*leucotis*	5	Venezuela, Brazil				D							T
	P.l.pfrimeri		Goias (Brazil)	?	4	?	A	V	L,t		Pend S	Y		S
	P.l.griseipectus		Ceara (Brazil)	<2,000	3	D	A	E	L,t		Pend S	Y		S
	P.l.emma/auricularis		Venezuela	>100,000	3	S	A	S						
	P.l.leucotis		south-east and east Brazil	<2500	3	S?	A	V	L,t		Pend S	Y		S
Pyrrhura	*picta*	9	northern South America				E							
	P.p.sspp1	5	Amazon basin	>1,000,000	3	S?	E	S	L					
	P.s.subandina, P.s.caerulescens, P.s.panchenkoi	3	Colombia	<10,000	3/4	D	A	V/E	L		Pend S	Y		S
	P.s. eisenmanni		Panama	<5,000	3	D	A	V/E	L		Pend S	Y		S
Pyrrhura	*viridicata*		north Colombia	10,000	3	S	A	S						
Pyrrhura	*egregia*	2	north Brazil, west Guyana, south-east Venezuela	>50,000	3/4	S	A	S						
Pyrrhura	*melanura*	5	Brazil, Colombia, Ecuador, Peru, Venezuela	>1,000,000	3/4	S	E	S						
	P.m.chapmani		south-west Colombia	>5,000	3	S?	A	V/S	L			Pend S		T,S
Pyrrhura	*rupicola*	2	Peru, Bolivia, Brazil	>100,000	3/4	S	D	S						S
Pyrrhura	*albipectus*		south-east Ecuador	>5,000	2	S?	A	E/V	L		Pend S	Y		T,S
Pyrrhura	*callipteta*		central Colombia	<5,000	2/3	D	A	E/V	L,P,H		Pend S	Y		S
Pyrrhura	*hoematotis*	2	north Venezuela	>50,000	3	S	A	S						
Pyrrhura	*rhodocephala*		west Venezuela	50,000	3	S	A	S						
Pyrrhura	*hoffmanni*	2	Costa Rica, west Panama	20,000	3	S	A	S						
Pyrrhura	*orcesi*		Ecuador	>2,000	3	D	A	E/V	L		Pend S	Y		S
Enicognathus	*ferrugineus*	2	Chile, Argentina	>50,000	3	S/I	B	S						
Enicognathus	*leptorhynchus*		Chile	>10,000	3	D?	A	V/S	LT,H,D		Pend S	Y		S
Myiopsitta	*monachus*	4	Bolivia, Brazil, Argentina, Uruguay, Paraguay	>5,000,000	3	S/I	E	S						

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	M.m.bechsti		central Bolivia	<2,000	2	?	A	V	L	Pend S	Pend S		S
Bolborhynchus	*aymara*		Bolivia, north-west Argentina	>10,000	3	?S	b	S					
Bolborhynchus	*aurifrons*	4	Peru, Bolivia, north-west Argentina, Chile	>50,000	3/4	S	C	S	T				
Bolborhynchus	*lineola*	2	Mexico to Panama, north-west South America, Peru, Ecuador	>100,000	4	D?	B	S	L?				
Bolborhynchus	*orbygnesius*		Peru, Bolivia	>20,000	3/4	S	C	S					
Bolborhynchus	*ferrugineifrons*		Colombia	<2,000	3	D	A	E	L	Pend S	Y		S,H
Forpus	*cyanopygius*	3	Mexico	<300,000	4-	D	C	S					
	F.c.insularis		Tres Marias Is (Mexico)	<2,500	3	?	Is	S/V	?	Pend S	Pend S		S
Forpus	*passerinus*	5	northern South America, Trinidad [West Indies]	>1,000,000	3/4	S	E	S					
Forpus	*xanthopterygius*	5	north to central South America	>1,000,000	3/4	S	E	S					
Forpus	*spengeli*		Colombia	>5,000	4	S?	A	S/V	?	Pend S	Pend T		T,S
Forpus	*conspicillatus*	3	east Panama, Colombia, west Venezuela	>500,000	3/4	S	C	S					
Forpus	*sclateri*	2	northern South America	>1,000,000	4	S	E	S					
Forpus	*coelestis*		Ecuador, Peru	>500,000	3/4	S	C	S					
Forpus	*xanthops*		Peru	<10,000	3	D	A	V	L,T?	Pend S	Y		S
Brotogeris	*tirica*		Brazil	>500,000	3	S	E	S					
Brotogeris	*versicolurus*	2	north-east to central South America	>1,000,000	3/4	S	E	S					
Brotogeris	*pyrrhopterus*		west Ecuador, north-west Peru	<50,000	3	D	B	V	L,T	Pend S	Y		
Brotogeris	*jugularis*	2	Mexico to Venezuela and north Colombia	>1,000,000	3/4	S	D	S					
Brotogeris	*cyanoptera*	3	west Amazon Basin				E						
	B.c.cyanoptera		Brazil, Colombia, Ecuador, Peru, Venezuela	>1,000,000	4	S	E	S					
	B.c.gustavi		north Peru	<10,000	4	D	A	V	L	Pend S	Y		S
	B.c.beniensis		north Bolivia	<10,000	4	?	B	S/V	?	Pend S	Pend S		S
Brotogeris	*chrysopterus*	5	Guianas, Brazil, Venezuela	>1,000,000	4	S	E	S					

SCIENTIFIC NAME			WILD POPULATION STATUS							RECOMMENDATIONS			
GENUS	SPECIES / SUBSP.	SS	WORLD RANGE	POPULATION SIZE EST.	DATA QUAL.	POP. TREND	AREA OF RANGE	M/L	THRTS	WORK-SHOP	*IN SITU*	RECO-VERY	T/S/H
Brotogeris	*sanctithomae*	2	Brazil, Ecuador, north Bolivia, Peru, Colombia	>1,000,000	3/4	S	E	S					
Nannopsittaca	*dachilleae*		Peru, Bolivia	50,000±	~4	S	B	S					
Nannopsittaca	*panychlora*		Venezuela, Guyana	100,000±	4	S	A	S					
Touit	*batavica*		Trinidad, Guyana, Suriname, Venezuela	100,000±	4	D	D	S	L				
Touit	*huetii*		northern South America	100,000±	4	D	E	S	L				
Touit	*dilectissima*		Colombia, Ecuador, Venezuela	100,000±	4	D	D	S	L				
Touit	*costaricensis*		Costa Rica, Panama	<7,500	3	D	A	V?	L	Pend S	Y		T,S,H
Touit	*purpurata*	2	Guianas, Brazil, south-east Colombia, south-east Ecuador, Peru, Venezuela	100,000±	4	D	C	S	L				
Touit	*melanonota*		Brazil	<5,000	3	D	B	V	L	Pend S	Y		S,H
Touit	*surda*		Brazil	<5,000	3	D	B	V	L	Pend S	Y		T,S,H
Touit	*stictoptera*		Colombia, Ecuador, Peru	>10,000	3	D	B	V/S	L		Pend S		S
Pionites	*melanocephala*	2	northern South America	>500,000	3/4	D	E	S	L,T,H				
Pionites	*leucogaster*	3	Brazil, Bolivia, Peru	>500,000	3/4	D	E	S	L?,T?,H?				
Pionopsitta	*pileata*		Brazil, Paraguay, Argentina	>10,000	3	C	D	V/S	L,T	Pend S	Y		S
Pionopsitta	*haematotis*	2	Mexico to Colombia	<50,000	3/4	D	C	S	L				
Pionopsitta	*pulchra*		west Colombia to west Ecuador	<50,000	3	S	B	S	L				
Pionopsitta	*barrabandi*	2	upper Amazon Basin	>100,000	4	S	E	S	L				
Pionopsitta	*pyrilia*		Colombia, Venezuela, ?Panama	<10,000	4	D	C	V	L	Pend S	Y		S,H
Pionopsitta	*caica*		north-east Brazil, Guianas, east Venezuela	50,000±	4	E	E	S	L				
Pionopsitta	*vulturina*		Brazil	50,000±	4	D	D	S	L				
Hapalopsittaca	*melanotis*	3	central Peru, Bolivia	<10,000	3	D	B	V/S	L	Pend S	Y		S,H
Hapalopsittaca	*amazonina*	3	Venezuela, Colombia	<1,000	3	D	A	E	L	Y	Y		S,H
Hapalopsittaca	*fuertesi*		Colombia	<100	2	D?	A	C	Hy?,L	Y		Y	S,H
Hapalopsittaca	*pyrrhops*		south-west Ecuador, north-west Peru	<500	1/3	D	A	C	L	Y	Y		S,H

SCIENTIFIC NAME			WILD POPULATION STATUS							RECOMMENDATIONS			
GENUS	SPECIES / SUBSP.	SS	WORLD RANGE	POPULATION SIZE EST.	DATA QUAL.	POP. TREND	AREA OF RANGE	M/L	THRTS	WORK-SHOP	*IN SITU*	RECO-VERY	T/S/H
Graydidascalus	*brachyurus*		south-east Colombia, Brazil, east Peru, east Ecuador	<500,000	4	D	E	S	L				
Pionus	*menstruus*	3	Trinidad, Costa Rica to Bolivia, central Brazil	>1,000,000	3/4	S	E	S					
	P.m.reichenowi		east Brazil	<2,000	3/4	D	A	E	L,T	Pend S	Y		T,S
Pionus	*sordidus*	6	Bolivia, Colombia, Ecuador, Peru, Venezuela	>100,000	3/4	S	D	S					
Pionus	*maximiliani*	4	north Argentina, Brazil, Bolivia, Paraguay	>100,000	3/4	D?	E	S	L?				
Pionus	*tumultuosus*		Peru, north Bolivia	<20,000	3/4	D	C	S?	L				S
Pionus	*seniloides*		Venezuela, Colombia, west Ecuador, north-west Peru	50,000±	3/4	D	C	S	L				
Pionus	*senilis*		south-east Mexico to Panama	<100,000	3/4	S?	C	S	L,T				
Pionus	*chalcopterus*	2	north-west Venezeuala, Colombia, north-west Peru, Ecuador	500,000±	3/4	S	D	S					
Pionus	*fuscus*		Brazil, Guianas, Venezuela, north Colombia	>50,000	3/4	D	E	S	L				
Amazona	*collaria*		Jamaica	<10,000	2	D	Is	V	L,T,H	Pend S	Y		S
Amazona	*leucocephala*	5	West Indies										
	A.l.leucocephala + palmarum		Cuba, Isle of Pines	10,000±	3	S?	B	V/S	L,t		Y		T,S
	A.l.hesterna		Cayman Brac, Little Cayman	300-430	1	S?	Is	E	L,T,H,Hy	Y	Y		T
	A.l.caymanensis		Grand Cayman	>1,000	1	S	Is	V	?(L,H,T, Hy,C)	Y	Y		T
	A.l.bahamensis		Bahamas	2,500±	1	?	Is	V	P,t,L	Y	Y		T
Amazona	*ventralis*		Haiti, Dominican Republic (Puerto Rico)	<5,000	2	D	B	V	L,T	Y	Y		S,T
Amazona	*albifrons*	3	Mexico to west Costa Rica	>50,000	3/4	S/I	D	S					
Amazona	*xantholora*		south-east Mexico, Belize, Honduras	10,000±	3/4	S/I	B	S					S
Amazona	*agilis*		Jamaica	<5,000	2	D?	Is	V	L,T,H	Pend S	Y		S,H
Amazona	*vittata*	2	Puerto Rico	40	1	I	Is	C	L,P,C	Y		Y	
Amazona	*tucumana*		south-east Bolivia, north Argentina	10,000±	3	D?	C	V/S	L,H,T		Y		S

SCIENTIFIC NAME			WILD POPULATION STATUS							RECOMMENDATIONS			
GENUS	SPECIES / SUBSP.	SS	WORLD RANGE	POPULATION SIZE EST.	DATA QUAL.	POP. TREND	AREA OF RANGE	M/L	THRTS	WORK-SHOP	*IN SITU*	RECO-VERY	T/S/H
Amazona	*pretrei*		south-east Brazil, north-east Argentina, Uruguay, ?Paraguay	5,000 -10,000	2	D	B	E/V	H,I,,T	Y	Y		S
Amazona	*viridigenalis*		Mexico [USA]	<5,000	2	D	B	E	L,T	Y	Y		
Amazona	*finschi*	2	Mexico	20,000±	3	D	C	V?	L?,T				S
Amazona	*autumnalis*	4	Ecuador, Mexico to Amazon Basin										
	A.a.autumnalis +salvini		Mexico to Colombia	>20,000	3/4	D?	C	S	t,L?				
	A.a.lilacina		W Ecuador	2,000±	2	D	A	E	L?,T	Y	Y		T,S
	A.a.diadema		Brazilian Amazon	<10,000	4	D?	B	V/S	L?,t				T,S
Amazona	*brasiliensis*		south-east Brazil	2,000±	1	D	A	C	L,T,H	Y	Y		
Amazona	*dufresniana*		Guianas, Venezuela,?north Brazil	10,000±	4	S?	C	V/S	L?,H				S
Amazona	*rhodocorytha*		coastal Brazil	<2,500	2/3	D?	B	E	L,T,H?	Y	Y		S
Amazona	*festiva*	2	northern South America	>50,000	3/4	S?	E	S	L,T				
Amazona	*xanthops*		Brazil, north Paraguay, east Bolivia	>20,000	3	D	E	S?	L				S
Amazona	*barbadensis*	2	Venezuela, Netherlands Antilles	>2,500	1/4	D	A, Is	E/V	H,T,P,L	Y	Y		T,S
Amazona	*aestiva*	2	north-east Brazil, Bolivai, Paraguay, north Argentina	>1,000,000	1/2/3	D	E	S	T,L,H		Y		
Amazona	*ochrocephala*	5	Trinidad, Panama to Amazon Basin	>1,000,000	3/4	S	E	S					
	A.o.xantholaema		Marajo Is (Brazil)	<5,000	3	D?	Is	V/E	L?	Pend S	Pend S		T,S
Amazona	*auropalliata*	2-3	Guatemala to Costa Rica	>50,000	3	D?	C	S	T?,L?				
Amazona	*oratrix*	3-4											
	A.o. oratrix + tresmariae (+ magna?)		Mexico	<5,000	2/4	D	C	E	T,L	Pend S	Y		S
	A. o. beliziensis		Belize	>10,000	3	S?	C	V/S	t				S
Amazona	*amazonica*	2	Trinidad, N. to C. South America	>1,000,000	3/4	S	E	S					
Amazona	*mercenaria*	2	Venezuela to Bolivia (Andes)	<30,000	3/4	D	D	S	L				
Amazona	*farinosa*	5	Mexico to C. South America	>1,000,000	3/4	S	E	S					

SCIENTIFIC NAME			WILD POPULATION STATUS							RECOMMENDATIONS			
GENUS	SPECIES / SUBSP.	SS	WORLD RANGE	POPULATION SIZE EST.	DATA QUAL.	POP. TREND	AREA OF RANGE	M/L	THRTS	WORK-SHOP	*IN SITU*	RECO-VERY	T/S/H
	A.f.guatemalae		Mexico to Honduras	10,000	3/4	D?	A/B	V/S	T,L		Y		S
Amazona	*kawalli*		Amazon basin	?		?	?		T				T
Amazona	*vinacea*		south-east Brazil, south-east Paraguay, north-east Argentina	<5,000	3/4	D	C	E/V	L,T	Pend S	Y		S
Amazona	*versicolor*		St. Lucia	300-350	1	I	Is	E	L,H,C		Y		H
Amazona	*arausiaca*		Dominica	300	1	I	Is	E	L,H,t		Y		H
Amazona	*guildingii*		St. Vincent	400-500	1	S	Is	E	T,L,H		Y		H
Amazona	*imperialis*		Dominica	80	1	I?	Is	C	L,H,T		Y		H
Deroptyus	*accipitrinus*	2	Amazon Basin	>20,000	3/4	D?	E	S	T,L				
Triclaria	*malachitacea*		south-east Brazil, ?Argentina	<5,000	3/4	D	C	V	L,T	Pend S	Y		S,H
Strigopinae													
Strigops	*habroptilus*		New Zealand	48	1	S	Is	C	P			Y	H

VII Parrot Conservation Projects

The following project outlines, which are classified geopolitically, provide a basis for the conservation of threatened parrot taxa. For taxa that have been identified as "Critical" or "Endangered" by Mace-Lande criteria, specific projects are suggested. Due to the many gaps in our knowledge of the status of most threatened parrots, specific projects are not included here for taxa that are presently thought to be "Vulnerable". Recommendations for all threatened species, including those considered "Vulnerable" are identified on a country-by-country basis in tabulated form.

The long-term conservation of many parrots might best be addressed by devising Regional Parrot Conservation Plans which treat all parrot species as a conservation unit. These strategies should attempt to safeguard populations of species currently designated as "Safe", by Mace-Lande criteria, as well as those already threatened. Hence the countries or regions for which these strategies are recommended do not necessarily have large numbers of threatened parrots: they may however be important refuges for parrots in the future. This concept is explored in the following section.

The projects identified below are thought to be the most urgent. It is hoped that the majority of these can be funded and initiated within the next five years. Recommendations, such as the need for surveys, recovery workshops and taxonomic research projects, are also specified in the Species Status Spreadsheets (section VI).

Project Budgets

In the following projects, budgets are based on existing project proposals where possible. In cases where it has been impossible to evaluate cost fully, budgets have been assigned to four categories based on the anticipated order-of-magnitude of cost. These budget categories are:

Category A: US$ <30,000
Category B: US$ 30,000-99,000
Category C: US$ 100,000-500,000
Category D: US$ >500,000

Budgets are based on an envisaged five-year period, unless stated otherwise, though some projects are shorter. The majority of surveys, for instance, are unlikely to last longer than six months. Follow-up projects to surveys or other shorter-term projects are not included in the budgets.

VII.I Global and Regional Projects

Workshop on Parrot Survey Methodology

As documented in Appendix 1, a number of methodologies could be applied to assess parrot population sizes, or to monitor population trends. However, there is presently no clearly defined set of criteria by which the most appropriate method can be chosen, or any standard approach for the various methods available. The clarification of the usefulness of various methodologies, and guidelines for their appropriate use, should be discussed, documented and agreed at a workshop.

The workshop would involve field ornithologists who have had experience with parrot surveys in different parts of the world. The main output would be a booklet on field techniques for surveying and monitoring parrot populations.

Budget: Category B

National and Regional Management Strategies (for key areas of parrot abundance and diversity)

Australia, Indonesia, the Philippines, Papua New Guinea, Mexico, Colombia, Venezuela, Brazil, the Guyanas (to be treated here as one zoogeographical unit), and the Caribbean (also to be treated as one unit) are key areas for parrot diversity.

Whilst these countries have many threatened parrot taxa, psittacines in Venezuela, Papua New Guinea and the Guyanas are mostly common, and few taxa are seriously threatened at present.

Australia, Indonesia, Colombia and Brazil take an intermediary position in that many of their parrot taxa remain widespread and common, or even abundant, but each already has a relatively long list of threatened taxa, including relatively high numbers of species in the Critical and Vulnerable Mace-Lande categories.

In Mexico, the Caribbean and the Philippines, most of the native parrot taxa have declined, and the majority are of conservation concern.

While this Action Plan deals mainly with threatened taxa, the development of long-term National or Regional Parrot Conservation Plans which address both threatened and non-threatened taxa is nevertheless considered important. By developing conservation plans in areas where few parrot taxa are threatened at the present time, it is hoped that future threats can, to some extent, be avoided.

Therefore, it is recommended that comprehensive National and Regional Parrot Conservation plans are prepared for the seven nations and two regions mentioned above, in which options are investigated that would promote the co-existence of healthy parrot populations with development. Opportunities for the

exploitation of the economic value of parrots, as, for example, tourist attractions or other forms of sustainable use, should be investigated as part of these national and regional strategies.

Whilst the above nations and regions are considered the priority areas for this conservation approach, Parrot Conservation Plans should be developed for other areas if and when opportunities arise. The ICBP Parrot Group and National Parrot Interest Groups should be responsible for developing these plans.

Budget: Category C

Taxonomic Investigations

Higher priority is often given to taxa, for conservation purposes, that are regarded as full species. Furthermore, it is generally easier to raise the profile, and hence funds for conservation, for full species, rather than threatened subspecies. The many uncertainties about the specific status of various psittacine taxa should be resolved because of these implications for conservation.

Analysis of DNA samples from the various recognised subspecies, and isolated populations of parrot, may provide information that is crucial to the conservation efforts of some species. Knowing the exact taxonomic status of critically threatened species is also a prerequisite for reintroduction or translocation in instances where this is recommended. A provisional list of taxa which may represent good species is provided in Table 6.
Budget: Category B

Table 6. Taxa for which taxonomic investigations are considered most important in assessing species status. Those species for which research would be most valuable are in shaded cells. SS denotes the number of recognised subspecies: subspecies of particular concern are indicated in the last column.

SPECIES	SS	PARTICULAR CONCERN
Trichoglossus haematodus	21	see Spreadsheets
Calyptorhynchus banksii	4	*graptogyne, naso*
Cacatua sulphurea	4	*citrinocristata*
Micropsitta kiensis	3	
Micropsitta geelvinkiniana	2	
Micropsitta finschii	5	
Micropsitta bruijnii	4	
Cyclopsitta guilelmiterti	7	*coxeni*
Cyclopsitta diophthalma	8	
Psittaculirostris desmarestii	6	
Psittinus cyanurus	3	*abbotti*
Psittacella picta	3	
Geoffroyus geoffroyi	16	
Geoffroyus heteroclitus	2	
Prioniturus discurus	4	
Prioniturus platurus	3	*sinerubris*
Alisterus amboinensis	6	*hypophonius*
Psephotus haematogaster	4	*narethae*
Cyanorhamphus malherbi		
Eunymphicus cornutus	2	
Psittacus erithacus	2-3	*timneh*
Loriculus philippensis	11	
Psittacula eupatria	5	*magnirostris*
Ara macao		(no recognised ssp.)
Aratinga holochlora	3	
Aratinga mitrata	2	*alticola*
Aratinga nana	3	*nana*
Pyrrhura picta	9	
Pyrrhura melanura	5	*chapmani*
Pyrrhura devillei		
Brotogeris versicolurus	3	
Touit surda	2	
Pionus menstruus	3	*reichenowi*
Amazona leucocephala	5	
Amazona autumnalis	4	*diadema, lilacina*
Amazona ochrocephala	?4	

Africa-wide Lovebird Project

Lovebirds, *Agapornis* spp., are among the most popular cage and aviary birds worldwide. Eight species are commonly kept in captivity. Three of these (*A. roseicollis*, *A. fischeri*, *A. personata*) are captive bred in very large numbers every year, but a significant trade in wild caught birds also still exists, although a moratorium has been imposed on international trade in *A. fischeri*. Table 7 provides a list of all species, and an overview of their ranges.

Despite their popularity among aviculturalists, the status and ecology of nearly all taxa of *Agapornis* remains very poorly known. The Black-cheeked Lovebird *A. nigrigenis* appears to have suffered a significant population decline in the last few decades, and for largely speculative reasons, has never recovered, and is considered Endangered by Mace-Lande criteria. More recently, the once very common Fischer's Lovebird *A. fischeri* has declined rapidly as a result of large-scale trapping for the wild bird trade. Lilian's Lovebird *A. lilianae* has also become rare in at least part of its range, whilst Western Black-collared Lovebird *A. swinderniana swinderniana* may be very rare. Lovebird taxa are therefore perhaps much more ecologically sensitive than their willingness to breed in captivity might suggest. The proliferation of feral populations, often involving hybrid birds, may also pose serious threats in the long-term.

Table 7. Species and subspecies of Lovebirds (*Agapornis*) in Africa, and their approximate distribution.

Species	Subspecies	Distribution
cana	*cana*	Madagascar, except central highlands and sw
cana	*ablectanea*	Madagascar, in arid south-west
pullaria	*pullaria*	western and central Africa, Sao Tome
pullaria	*ugandae*	sw Ethiopia, se Sudan to Tanzania
taranta		highlands of Ethiopia
swinderniana	*swinderniana*	Cote d'Ivoire, Liberia, s Ghana
swinderniana	*zenkeri*	Cameroon & Gabon to w Cen Af Rep & Zaire
swinderniana	*emini*	c Zaire to w Uganda
roseicoliis	*roseicollis*	Namibia to n South Africa, Botswana
roseicollis	*catumbella*	s Angola
fischeri		n Tanzania [introduced Kenya]
personata		n Tanzania [introduced Kenya]
lilianae		s Tanzania, nw Mozambique, s Malawi, se Zambia to n Zimbabwe
nigrigenis		sw Zambia, Namibia, ? nw Zimbabwe

A project focusing on Lovebirds as a group is therefore recommended. It is envisaged that such a project should initially

focus on an intensive literature survey and brief field surveys, to be followed-up by comparative ecological studies of various of the species. The final output should be a long-term conservation and management plan and its implementation, including, where appropriate, a provision for sustainable trade in members of the genus. In particular, the current exploitation of Fischer's Lovebird requires urgent attention.
Budget: Category C
Literature: Collar & Stuart 1985, Edwards & Broad 1992, Baker 1991, Turner 1991.
Notes: Project specifically focusing on the Black-cheeked Lovebird and Fischer's Lovebird are outlined in the next section.

Review of Listings on the CITES Appendices Review and Field Assessments for Significantly Traded Parrot Species

There should be a thorough review of listings of all parrot taxa in the Appendices of the Convention on International Trade in Endangered Species of Fauna and Flora (CITES). Recommendations for changes in species' listings from such a review should be presented to the CITES Parties through the CITES Animals Committee. For those species remaining on Appendix II, the review should include the identification of measures necessary to ensure that trade is not threatening species' survival and is at sustainable levels. Such a review should be conducted as part of the CITES Significant Trade Project by the Trade Specialist Group of the IUCN Species Survival Commission and the Wildlife Trade Monitoring Unit of the World Conservation Monitoring Centre in conjunction with ICBP Parrot Group members and other experts.

Parrot taxa for which insufficient data exist to enable a determination of the sustainability of trade or the impact of trade on wild populations should be the subject of status assessments and ecological research in the field. In some instances, where indications are that off-take for trade may be seriously depleting populations, trade moratoria should be considered pending results from such assessments. An immediate focus of pilot field assessments should be an assessment of the population status of the species, including trends and the impact of trade, for the purpose of interim management regimes. Field assessments should also lay the groundwork for long term research and monitoring necessary for the conservation of the species. Interim management regimes should include capture/export quotas well within limits of sustainability in the context of a trade control system that is enforces and effective in containing illegal off-take from the wild.

Budget: Category A for review process. Category B for each species (or group of sympatric species) for which survey and ecological research needs are identified by such a review.

VII.II Projects for Selected Taxa

Selection of Projects

The species-specific projects that are briefly outlined below have been selected on the basis of their Mace-Lande threat category. All taxa which are considered to be either Critical or Endangered are included in specific projects. Threatened taxa that are not specifically indicated in specified projects are tabulated in the individual country tables that are included in this section. These tables list all taxa that are considered threatened by Mace-Lande criteria on a country basis, and highlight the types of conservation actions that have been identified as necessary components of individual taxon conservation needs (see the Action Plan Species Status Spreadsheets). There are no tables for countries for which there are only one or two threatened taxa if these taxa are covered by specific projects.

Australasia/Pacific

Australia

The conservation priorities and recommended projects are primarily based on Garnett (1992a). For a more detailed discussion of the problems and conservation action needed for threatened Australian parrots the Royal Australian Ornithologists Union document should be consulted. Some taxa covered by Garnett (1992a) are not included in the following list of projects since their threat status is unclear, and they are not considered urgent priorities. Budgets for Australian projects are derived from Garnett (1992a): additional funds may already be secured.

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in:[1]	RECOMMENDATIONS					
		W	T	S	M	R	H
CRITICAL							
Cyclopsitta diophthalma coxeni	E		Y			Y	
Cyanoramphus novaezelandiae cookii	E		Y			Y	
Neophema chrysogaster	E					Y	
Psephotus pulcherrimus (extinct?)	E			Y			
ENDANGERED							
Psephotus chrysopterygius	E	Y			Y		
Pezoporus wallicus flaviventris	E	Y			Y		Y
Geopsittacus occidentalis	E	?		Y	Y		
VULNERABLE							
Calyptorhynchus latirostris	E				Y		
Cacatua p. pastinator	E						
Polytelis swainsonii[2]	E				Y		
Polytelis a. anthopeplus[3]	E				Y		
Polytelis alexandrae	E	Y		Y	Y		
Lathamus discolor[4]	E	?			Y		

[1] E = Endemic
Recommendations: Y in Recommendations columns indicates that action is recommended for: W-Recovery Workshop; T-Taxonomy; S-Field Survey; M-*In Situ* Management; H-Husbandry Research; C-Captive population.
Pending results of field survey, taxonomy or husbandry research.
[2] Conservation action is being undertaken by the New South Wales Forestry Commission that addresses some of the needs of this species.
[3] Measures to protect part of habitat of the Eastern Regent Parrot have been taken in South Australia and Victoria
[4] Blue Gum has been planted to assist with the conservation of this species in Tasmania

ORANGE-BELLIED PARROT *Neophema chrysogaster*
Mace-Lande Status: Critical
Project Title: **Recovery of Orange-bellied Parrot.**
Project Aims: To increase the population from present critically low level, and to safeguard sufficient overwintering habitat.
Justification: Although stable, the population numbers only *ca.* 150 individuals.
Project Description: Ecological studies in the wintering habitat are necessary to assess management needs. Further areas of suitable wintering habitat should be identified and recommended as additions to the conservation area. A more detailed understanding

of movements made during the non-breeding season is also essential to long-term conservation efforts.
Budget: US $ 250,000
Literature: Garnett 1992a, 1992b.
Notes: Treated as Endangered by Garnett (1992). Has been the subject of an ongoing conservation project for several years. Considerable success has been achieved in reserving and actively managing habitat of this migratory species in Tasmania, on King Island and in Victoria. A well managed, captive-breeding programme is also in place. It should be noted that both wild and captive Orange-bellied Parrot populations are infected with the presently untreatable Psittascine Beak and Feather Disease (Brown 1991).

COXEN'S FIG PARROT *Cyclopsitta diophthalma coxeni*
Mace-Lande Status: Critical
Project Title: **Recovery of Coxen's Fig Parrot.**
Project Aim: To safeguard this subspecies by securing its remaining dry rainforest habitat.
Project Justification: Coxen's Fig Parrot is probably mainland Australia's most endangered parrot. Despite intensive searches, the largest winter flock seen in the last 20 years has contained only eight birds.
Description: Further studies of the status and ecology of the species in the valleys of the Lamington Plateau are urgently needed, and all options need to be explored immediately to preserve remaining traditional feeding trees and stands of dry rainforest. If, as suspected, there is a shortage of winter food, and habitat fragmentation is preventing access to food trees, planting of these needs to be encouraged. The feasibility of reintroduction into parts of its former range should also be considered.
Budget: US $ 250,000
Literature: Joseph 1987, Garnett 1992, Spittall 1992.
Notes: Surveys to locate the subspecies were conducted in 1984 and 1989. Captive breeding expertise for this species is being developed using *C.d.macleayana*.

PARADISE PARROT *Psephotus pulcherrimus*
Mace-Lande Status: Extinct/Critical
Project Title: **Search for the Paradise Parrot.**
Project Aim: To make intensive searches for the Paradise Parrot and, if located, to prescribe and initiate necessary conservation actions.
Justification: The last authenticated sighting was in 1927, though small populations conceivably persist in remote areas. If extant, the species is likely to be critically threatened. Recent reports are all unsubstantiated and surrounded in secrecy.
Project Description: Searches for the species should be conducted in suitable areas, most notably in northern Queensland
Budget: US $ 30,000 for survey work.
Literature: Joseph 1987, Collar & Andrew 1988, Forshaw & Cooper 1989.

NORFOLK ISLAND GREEN PARROT *Cyanoramphus novaezelandiae cookii*
Mace-Lande Status: Critical
Project Title: **Recovery of the Norfolk Island Green Parrot.**
Project Aim: To reduce threats from predators and competitors and promote population increase of the taxon.
Justification: Only about forty birds remain in the wild, and a further 13 in captivity.
Project Description: The existing management schemes need to continue, and eradication programmes for rats, cats and Crimson Rosellas within the Norfolk National Park needs to be initiated. Re-establishment of suitable habitat on Phillip Island and introduction of the species to that island are both important parts of the conservation plan for this species.
Budget: US $ 200,000
Literature: Garnett 1992
Notes: An intensive, and successful, management programme is on-going. Birds are breeding in captivity. Treated as a species by Sibley & Monroe (1989).

GOLDEN-SHOULDERED PARROT *Psephotus chrysopterygius*
Mace-Lande Status: Endangered
Project Title: **Conservation of the Golden-shouldered Parrot.**
Project Aims: To secure and enlarge the current population and develop a fire management strategy for the woodlands of Cape York Peninsula.
Justification: Once more widespread, now only one small population of the Golden-shouldered Parrot is thought to survive in the central Cape York Peninsula.
Project Description: Illegal trapping, and a multitude of other threats ranging from overgrazing by stock to predation by feral cats and an altered fire regime, are suspected of contributing to its decline. A study of the extent of these threats is needed in order to prepare management guidelines, especially a fire management strategy. Stricter control and a public awareness campaign is necessary to eliminate illegal trapping and nest robbing.
Budget: $ 200,000
Literature: Garnett 1992
Notes: A three year study of Golden-shouldered Parrot, funded by QNPWS and WWF was initiated in 1992.

WESTERN GROUND PARROT *Pezoporus wallicus flaviventris*
Mace-Lande Status: Endangered
Project Title: **Conservation of the Western Ground Parrot.**
Project Aims: To ensure the survival of existing populations and enable their expansion.
Justification: Less than 450 Western Ground Parrots are thought to survive in two isolated populations. Although all are in conservation areas (Fitzgerald River National Park and Cape Arid National Park) numbers are still declining.
Project Description: The main reason for the continuing decline is fire, but predation by introduced foxes and feral cats may also be a significant threat. The extent of the predation problem needs study, as well as the ability of the species to recolonise burnt habitat. Management guidelines for suppression of fire should be developed, and based on progress with all these recommendations, the potential for translocation to other sites (notably Two Peoples Bay Nature Reserve), should be examined.
Budget: US $ 85,000

Literature: Watkins & Burbidge 1992, Garnett 1992, McFarland 1989.
Notes: The biology of Ground Parrots in Queensland has been studied by McFarland (see e.g. 1991).

NIGHT PARROT *Geopsittacus occidentalis*
Mace-Lande Status: ?Endangered
Project Title: **Surveys and status assessment of the Night Parrot.**
Project Aim: To ascertain the status and viability of populations of the Night Parrot (and Princess Parrot).
Justification: The Night Parrot is probably Australia's least known parrot. Historical records of this, and the poorly known **Princess Parrot** *Polytelis alexandrae* (Endangered/Safe), suggest that these species are scattered through huge areas of interior Australia. There is much disagreement as to the present conservation status of both species: but both may have declined.
Project Description: Surveys for these two species should be conducted in an attempt to ascertain the status and threats to existing populations, and to identify key sites for conservation projects based on these parrots, if surveys suggest that such areas are necessary. Longer-term ecological studies are also recommended, if populations are located.
Budget: Category B, for surveys
Literature: Boles *et al.* 1991, Allen 1987, Garnett 1992
Notes: Due to the vastness of the area concerned, data collecting on both species is thought to be most feasible by alerting all ornithological societies and volunteer bird watchers to the lack of information, and encouraging them to report, in detail, all sightings.

New Zealand

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in:[1]	RECOMMENDATIONS					
		W	T	S	M	R	H
CRITICAL							
Strigops habroptilus	E					Y	Y
ENDANGERED							
Cyanoramphus auriceps forbesi	E	?				Y	
**Cyanoramphus malherbi* (Vulnerable?)			Y		#		
Nestor meridionalis	E				Y		Y
VULNERABLE							
Cyanoramphus unicolor[2]	E				Y		
Nestor notabilis	E				Y		Y
Cyanoramphus novaezelandiae[3]	Aust, New Cal		Y		Y		
Cyanoramphus novaezelandiae chathamensis							
Cyanoramphus auriceps auriceps[3]	E				Y		

[1] E = Endemic
Recommendations: Y in Recommendations columns indicates that action is recommended for: W-Recovery Workshop; T-Taxonomy; S-Field Survey; M-*In Situ* Management; H-Husbandry Research; C-C-Captive population. # Pending results of field survey, taxonomy or husbandry research.
* May not be a valid taxon. Aust = Australia, New Cal = New Caledonia
[2] The island habitat of the species is strictly protected, but permanent vigilance is necessary to prevent the introduction of rats
[3] Both are well protected on a number of offshore islands

KAKAPO *Strigops habroptilus*
Mace-Lande Status: Critical
Project Title: **Recovery of the Kakapo.**
Project Aim: To bring the population back to safe levels from the present critically low numbers.
Justification: The Kakapo population survives only because of intensive management efforts. In October 1992 only *ca.* 48 remained.
Project Description: Intensive protection and management of Kakapos on Little Barrier and other offshore islands needs to continue for an indefinite number of years.
Budget: Funding secured through the "Threatened Species Trust" administered by the New Zealand Department of Conservation and the Forest and Bird Protection Society.
Literature\References: Powlesland 1989, Triggs *et al.* 1989, LLoyd 1992, A. Tennyson, *in litt*, 1992; D.J. Butler, *in litt.*, 1992, M.D. Sibley *in litt*. 1992.
Notes: Despite major conservation efforts the Kakapo population declined rapidly throughout recent decades and only intensive management, involving the translocation of birds to predator-free islands, halted further decline. No chicks were raised for a number of years, until in 1991 artificial feeding of the Kakapo population on Little Barrier Island stimulated breeding behaviour, and resulted in successful raising of two chicks. In 1992, six chicks hatched on Codfish Island, three of which died on the island (probable cause: starvation after failure of food supply) and three of which were rescued and captive-raised. Two of these subsequently died in captivity post-fledging, due to pneumonia associated with aspiration of food particles, but the third survived to be transferred to Maud Island. Predation by *Rattus*

exulans is still a problem on Codfish and Little Barrier Island. A survey of the genetic variation in the population was completed in 1989.

KAKA *Nestor meridionalis*
Mace-Lande Status: Endangered
Project Title: **Conservation of Kaka**
Project Aims: To manage Kaka populations and their habitats to reverse the current declines on the mainland.
Justification: The distribution and numbers of Kaka have decreased dramatically since last century. Threats faced by this species include habitat loss, predation by introduced mammals and interspecific competition with wasps *Vespula* spp. and possums *Trichosurus vulpecula*. A recent PHVA suggests that mainland populations are faced with extinction within 50 years if current threats are not dealt with.
Project Description: A project is currently being developed in New Zealand by the Threatened Species Unit of the New Zealand Department of Conservation. It will involve monitoring populations, research on the control of predators and competitors, research on supplementary feeding, research on husbandry in captivity and possibly the development of techniques for re-introduction of captive-bred birds.
Budget: Category C
Literature\References: CBSG in prep., D.J. Butler, *in litt.*, 1992, Bull *et al.* 1985, Beggs & Wilson 1991.

FORBES' PARAKEET *Cyanoramphus auriceps forbesi*
Mace-Lande Status: Endangered
Project Title: **Conservation of Forbes' Parakeet.**
Project Aim: To assist the recovery of the Forbes' Parakeet, and to prevent genetic swamping, and to reduce further hybridisation with sympatric Red-crowned Parakeet *C.novaezelandiae chathamensis*.
Justification: Forbes' Parakeet is confined to two small islands where the population is *ca.* 350 individuals.
Project Description: Support for on-going conservation efforts, including the removal of all parakeets except those that look like pure Forbes' Parakeets from Mangere Island, and efforts to re-establish and improve the habitat of the Chatham Islands.
Budget: Category C
Literature\References: Taylor 1986, Triggs & Daugherty 1988, A. Tennyson *in litt.*, 1992, D.J. Butler *in litt.*, 1992.
Notes: It is anticipated that once the habitat of the Forbes' Parakeet has been re-established, and that numbers have increased sufficiently, hybridisation may no longer occur.

New Caledonia

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in:[1]	RECOMMENDATIONS					
		W	T	S	M	R	H
CRITICAL							

Charmosyna diadema (Extinct ?)	E			Y			
Eunymphicus cornutus uvaeensis	E	Y		Y		Y	
ENDANGERED: None							
VULNERABLE: None							
Eunymphicus cornutus cornutus (Safe?)	E			Y			

[1] E = Endemic.
Recommendations: Y in Recommendations columns indicates that action is recommended for: W-Recovery Workshop; T-Taxonomy; S-Field Survey; M-*In Situ* Management; H-Husbandry Research; R-Recovery Efforts. # Pending results of field survey, taxonomy or husbandry research.

OUVEA HORNED PARAKEET *Eunymphicus cornutus uvaeensis*
Mace-Lande Status: Critical
Project Title: **Recovery of the Ouvea Horned Parakeet.**
Project Aim: To assess the current status of the Ouvea Horned Parakeet and to design an action plan aimed at the recovery of this distinctive subspecies.
Justification: Restricted to the 110 km^2 island of Ouvea in the Loyalty group, numbers of this distinctive subspecies are probably below 200. The taxon is critically endangered, but no assessment of the situation has recently been undertaken due to the delicate political situation on Ouvea.
Project Description: A survey to determine the status of the parakeet and the development of a conservation plan, in cooperation with local people and institutions, is urgently required. A captive breeding flock could be established at Parc Forestiere in Noumea, where the Kagou has been very successfully bred. Aviaries must be constructed according to specific safety standards to prevent escape of birds to New Caledonia where they could potentially hybridise with nominate *E. c. cornutus*. The suitability of two Loyalty Islands, Mare and Lifu, should be assessed as potential sites for establishing a second wild population.
Budget: Category B
Literature\References: King 1981, D. Rinke, *in litt.*, 1992, R. Hay *in litt.*, 1992.
Notes: Ouvea is a flat and easily accessible island with forest remaining only in isolated patches along the coast. About 200 surviving birds were estimated in the 1970s. An earlier attempt to release wild caught Ouvea Horned Parakeets on Lifu failed, as the birds apparently flew back to Ouvea.
Short surveys on Mare and Lifu are planned for 1993 (Brehm Fund for International Bird Conservation), as well as discussions with the *Association pour le Sauvegarde de la Nature Neo-Caledonienne* concerning the construction of aviaries.

NEW CALEDONIAN LORIKEET *Charmosyna diadema*
Mace-Lande Status: Extinct/Critical
Project Title: **Status assessment of the New Caledonian Lorikeet.**
Project Aim: To ascertain the status of the New Caledonian Lorikeet.
Justification: Known only for certain from two old specimens, the species must be extremely rare or localised, if extant.
Project Description: Searches for the species should be conducted in the vicinity of Mt Panie and in other likely areas of New Caledonia. This project should be seen as a preliminary to formulating conservation planning, assuming that the species is not extinct and that conservation efforts are deemed appropriate.

Budget: Category A for survey only.
Literature: Forshaw & Cooper 1989.
Notes: Bushmen on New Caledonia report observing the species in 1976.

French Polynesia

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in:[1]	RECOMMENDATIONS					
		W	T	S	M	R	H
CRITICAL							
Vini ultramarina	E					Y	
ENDANGERED							
Vini peruviana	E (Cook Islands)*				Y		
Vini kuhli	Kiribati				Y		
VULNERABLE: None							

[1] E = Endemic.
Recommendations: Y in Recommendations columns indicates that action is recommended for: W-Recovery Workshop; T-Taxonomy; S-Field Survey; M-*In Situ* Management; H-Husbandry Research; R-Recovery Efforts. # Pending results of field survey, taxonomy or husbandry research.
*Cook Islands - Introduced

ULTRAMARINE LORIKEET *Vini ultramarina*
Mace-Lande Status: Critical
Project Title: **Habitat Restoration and Translocation of Ultramarine Lorikeet.**
Project Aim: To protect existing populations of Ultramarine Lorikeets from nest-predation by rats, and to establish new populations, if feasible, on other suitable islands.
Justification: Predation by Roof Rats *Rattus rattus* has been identified as the major factor causing the decline and extinction of Polynesian lorikeets, two of which are known to have become extinct after the arrival of man (Steadman & Zarriello 1987). The Ultramarine Lorikeet has become extinct on all but Nuku Hiva and Uo Pou, and Ua Huka where it had become extinct but was reintroduced in the 1940's. Five years after the arrival of Rats on Uapou, the lorikeets disappeared almost completely. By the end of the 1980s roof rats had been seen on Ua Huka, the Lorikeet's last stronghold, where between 1,000 to 1,500 lorikeets remain.
Project Description: Rat-proof nest boxes should be installed and maintained on Ua Huka to determine whether such an initiative may offer any hope in sustaining a lorikeet population on rat-invested islands. The translocation of Ultramarine Lorikeets to islands free of Roof Rats has been proposed several times. However, only one island with suitable habitat is available in the Marquesas: Fatu Hiva. A second island, Mohotani, is uninhabited by humans and would be even more suitable in the long term. It is, however, highly degraded due to the presence of feral sheep and cats. Both would need to be eradicated, while regeneration of the vegetation is expected to occur naturally once the sheep have been removed. To ensure the survival of the Ultramarine Lorikeet the establishment of populations on Fatu Hiva and Mohotani is essential.

In 1992, seven Ultramarine Lorikeets were translocated to Fatu Hiva by the Zoological Society of San Diego in collaboration with

the government of French Polynesia, as one component of a programme which includes field research and captive rearing. An employee of the Rural Economy Service will be responsible for monitoring the introduced birds, and it is planned that the translocation programme will continue on an annual basis. A small booklet about the Ultramarine Lorikeet for a public awareness campaign in the Marquesas Islands should be produced. .
Budget: Category C
Funds needed include:

Mammal eradication from Mohotani	$ 200,000
Conservation education campaign on Fatu Hiva	$ 10,000
Nest box scheme on Ua Huka	$ 10,000

References: Steadman 1989, Seitre & Seitre 1991, D. Rinke, *in litt.*, 1992, Anon. 1992b., C. Kuehler and A. Lieberman *in litt.* 1992.
Notes: An assessment study for the eradication of the introduced mammals from Mohotani will be undertaken, possibly in 1993 by the Brehm Fund for International Bird Conservation.

TAHITIAN LORY *Vini peruviana*
Mace-Lande Status: Endangered
Project Title: **Island Restoration for the Tahitian Lory.**
Project Aim: To minimize the extinction risk to the Tahitian Lory by allowing it to repopulate some smaller islands in its original range.
Justification: The Tahitian Lory has disappeared from most islands within its large range, mainly due to nest predation by Roof Rats.
Project Description: As the survival of the Tahitian Lory depends on the existence of a sufficient number of islands free of Roof Rats and cats, the most promising conservation measure to be taken will be the eradication of these introduced mammals from islands in the vicinity of other islands still holding remnant populations of the lory. Although the lory is known to be a strong flier, and may repopulate some predator-free islands, translocations should be considered if deemed necessary. Tetiaroa Atoll is a very suitable candidate for an early rat eradication campaign given the approval of the owner. Natural repopulation of Tetiaroa Atoll is, however, not an option, but active reintrodcution stands a very good chance of success. It is important that these efforts are complemented by simultaneous public awareness campaigns, and that islanders are involved in the eradication work. This will help reduce the risks of reintroduction of mammalian species once eradicated.
Budget: Category B for rat eradication per island. Category A for public awareness project.
References: R. Hay *in litt.*, 1992
Notes: Two expeditions to the Tuamotu Islands will be undertaken by the Brehm Fund for International Bird Conservation in 1994. One purpose will be to determine the distribution of lorikeets and the three species of rats which have invaded Polynesia (*Rattus rattus, R. norvegicus, R. exulans*) and identify atolls where rat eradication followed by natural recolonisation by lories is feasible.

French Polynesia and Kiribati

KUHL'S LORY *Vini kuhli*
Mace-Lande Status: Endangered
Project Title: **Conservation of Kuhl's Lory.**
Project Aim: To maintain and possibly increase the present population size of Kuhl's Lory
Justification: Kuhl's Lory survives on a single island, Rimatara (French Polynesia), within its original range (Tubuai and southern Cook Islands) and two islands, Tabuaeran and Teraina, in the Line Islands (Kiribati), where it is introduced. All three existing populations number only a few hundred individuals each. Roof Rats *Rattus rattus*, which are the greatest potential threat, have recently arrived on Rimatara, and the Kuhl's Lory's disappearance from the last island in its original range seems inevitable without intervention.
Project Description: A three point project is needed to 1) experiment with the protection of existing nest sites from rats and to investigate whether lories on Rimatara would accept artificial rat-proof nest-boxes for breeding 2) to take preventive measures against rat invasion on Tabuaeran and Teraina and 2) to identify other rat-free islands in Micronesia to which lorikeets could be translocated, if necessary. Remote atolls in Tuvalu, Kiribati# and the Federal States of Micronesia with small human populations should be surveyed.
Budget: Category B
References: Seitre & Seitre 1991, D.Rinke *in litt.*, 1992, R. Hay *in litt.*, 1992.
Notes: There has been a recent proposal for the reintroduction of the species to Rarotonga. This would be experimental, but could be undertaken in conjunction with an intensive rat control programme aimed at the recovery of the Rarotonga Monarch *Pomarea dimidiata*.

Papua New Guinea

The following taxa are of conservation concern.

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in: [1]	RECOMMENDATIONS					
		W	T	S	M	R	H
CRITICAL: None							
ENDANGERED: None							
VULNERABLE							
Lorius albidinuchus	E			Y			
Psittrichus fulgidus	Indonesia			Y			

[1] E = endemic
Recommendations: Y in Recommendations columns indicates that action is recommended for: W-Recovery Workshop; T-Taxonomy; S-Field Survey; M-*In Situ* Management; H-Husbandry Research; R-Recovery Efforts. # Pending results of field survey, taxonomy or husbandry research.

Solomon Islands

The following taxa are of conservation concern.

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in:[1]	RECOMMENDATIONS					
		W	T	S	M	R	H
CRITICAL: None							
ENDANGERED: None							
VULNERABLE							
Lorius chlorocercus	E			Y	Y		
Geoffroyus heteroclitus hyacinthinus	E		Y	Y			

[1] E = endemic
Recommendations: Y in Recommendations columns indicates that action is recommended for: W-Recovery Workshop; T-Taxonomy; S-Field Survey; M-*In Situ* Management; H-Husbandry Research; R-Recovery Efforts. # Pending results of field survey, taxonomy or husbandry research.

Fiji

The following taxa are of conservation concern.

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in:[1]	RECOMMENDATIONS					
		W	T	S	M	R	H
CRITICAL: None							
ENDANGERED: None							
VULNERABLE							
Charmosyna amabilis	E			Y			
Vini australis (Safe)	Tonga, Samoa			Y			
Prosopeia tabuensis tavineiensis	E				Y		
Prosopeia splendens	E			Y	Y		

Samoa and Tonga

The following taxa are of conservation concern.

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in:[1]	RECOMMENDATIONS					
		W	T	S	M	R	H
CRITICAL: None							
ENDANGERED: None							
VULNERABLE							
Vini australis[2] (? Safe)	Fiji Is.			Y			

[1] E = endemic
Recommendations: Y in Recommendations columns indicates that action is recommended for: W-Recovery Workshop; T-Taxonomy; S-Field Survey; M-*In Situ* Management; H-Husbandry Research; R-Recovery Efforts. # Pending results of field survey, taxonomy or husbandry research.
[2] The conservation needs of this species in Tonga are the subject of an on-going study by the Brehm Fund for International Bird Conservation

Henderson Island, Pitcairn Group (to **United Kingdom**)

HENDERSON LORY *Vini stepheni*
Mace-Lande Status: Endangered
Project Title: **Assessment of Conservation Needs of Henderson Lory.**
Project Aim: To identify threats to the Henderson Lory, and to prescribe conservation action if deemed necessary.
Justification: The Henderson Lory survives on a single, uninhabited island, Henderson Island (Pitcairn Group, to UK). Although it has probably always been rare, the population size was estimated to be between 500 and 1,000 during an 18 month study of the island's birds in 1991-1992, and only a few young birds were observed, suggesting that breeding success might be low. The Polynesian Rat *Rattus exulans* is common on the island, and may be a potential threat. Pitcairn Islanders exploit larger trees around the edge of the island, although evidence suggests that these species of tree arrived after the Henderson Lory, and are therefore unlikely to be of particular importance to the latter.
Project Description: A long-term study, perhaps as a PhD, should be undertaken to investigate the habitat requirements and threats to the Henderson Lory. In particular, breeding requirements, breeding success and demography should be investigated.
Budget: Category C
References: D. Brookes, pers. comm. 1992.
Notes: Whilst the exact status of the Henderson Lory is unknown, it is treated as Endangered in this Action Plan in view of the very small population size and potential vulnerability as a single-island endemic. Further information may enable the downgrading of Mace-Lande Status. Three other endemic birds occur on Henderson Island, and all may benefit from a long-term research project based on the island.

Asia/Wallacea

Indonesia

Indonesia is of special concern because of the large number of parrots, many of which are endemic, that are exploited for trade to satisfy international and considerable domestic demand. In some instances this trade is probably unsustainable at present levels. Hence, many of the *in situ* management recommendations and workshop recommendations that are made for these species are aimed at tackling the problem of regulating trade at sustainable levels. *In situ* recommendations for many of the species here refer to education and public awareness campaigns as well as the implementation of management regimes that are sustainable. Many of the recovery workshops that are suggested would also focus largely on trade-related problems, and it is envisaged that many species could be included at each workshop, so that perhaps only five workshops, dealing with the different parts of Indonesia, would be necessary.

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in:[1]	RECOMMENDATIONS					
		W	T	S	M	R	H
CRITICAL							
Eos histrio (two ssp. Endangered?)	E	#		Y	Y		
Cacatua sulphurea citrinocristata	E	Y	Y		Y		
Cacatua goffini (Endangered?)	E	#		Y	Y		
Cacatua moluccensis (Endangered?)	E	Y		Y	Y		Y
Loriculus catamene (Extinct?)	E	#		Y			
ENDANGERED							
Eos cyanogenia	E	#		Y	Y		
Eos reticulata (? Vulnerable)	E	#		Y	Y		
Lorius domicellus	E	#		Y	Y		
Lorius garrulus garrulus	E	Y			Y		
Lorius garrulus flavopalliatus	E	Y			Y		
Lorius garrulus morotaianus	E	#			Y		
Trichoglossus haematodus mitchellii (?Vulnerable)	E	#	Y	Y	Y		
Cacatua sulphurea sulphurea	E	#	Y	Y	Y		
Cacatua sulphurea parvula	E	#	Y	Y	Y		
Cacatua sulphurea abbotti (valid sspp.?)	E	#	Y	Y			
Cacatua alba	E	Y			Y		Y
Tanygnathus lucionensis	Phil, Mal			Y	Y		Y
Tanygnathus megalorynchos hellmayri (? Vulnerable)	E	#		Y	#		
Eclectus roratus cornelia	E	Y			Y		
Eclectus r. riedeli (? Vulnerable)	E	#			Y		
Loriculus flosculus	E	#		Y			
Alisterus amboinensis hypophonius (? Vulnerable)	E	Y	Y	Y	Y		Y

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in:[1]	RECOMMENDATIONS					
		W	T	S	M	R	H
VULNERABLE							
Eos squamata riciniata	E	Y			Y		
Eos squamata obiensis	E	Y	Y		Y		
Eos semilarvata	E	#		Y			
Lorius lory cyanuchen	E	#		Y	#		
Trichoglossus haematodus forsteni	E	#	Y	Y	Y		
Trichoglossus haematodus djampeanus	E	#	Y	Y	Y		
Trichoglossus haematodus weberi (Safe?)	E	#	Y	Y	Y		
Trichoglossus haematodus stresmanni	E	#	Y	Y	#		
Trichoglossus haematodus rosenbergi	E	Y	Y	Y	Y		
Probosciger aterrimus (? Safe)	PNG, Aus	#	Y	Y	#		
Psittaculirostris salvadorii	E	#		Y	Y		
Psittaculirostris desmarestii (4 sspp.)	E	#	Y	Y	Y		Y
Psittinus cyanurus abbotti (? Safe)	E	#	Y	Y	#		
Prioniturus flavicans (? Safe)	E	#		Y	Y		
Prioniturus platurus talautensis	E	#	Y	Y	#		
Tanygnathus gramineus	E	#		Y	#		
Psittrichus fuligidus	PNG			Y			Y
Alisterus amboinensis amboinensis	E	Y	Y	Y	Y		
Alisterus amboinensis sulaensis	E	Y	Y	Y	Y		
Alisterus amboinensis buruensis	E	Y	Y	Y	Y		
Alisterus amboinensis versicolor	E	#	Y	Y	Y		
Loriculus sclateri ruber	E		Y	Y			
Psittacula alexandri alexandri	E	#		Y	Y		

[1] E = Endemic.
Recommendations: Y in Recommendations columns indicates that action is recommended for: W-Recovery Workshop; T-Taxonomy; S-Field Survey; M-*In Situ* Management; H-Husbandry Research; R-Recovery Efforts. # Pending results of field survey, taxonomy or husbandry research.
Phil = Philippines, Mal = Malaysia, PNG = Papua New Guinea, Aus = Australia.

CITRON-CRESTED COCKATOO *Cacatua sulphurea citrinocristata*
Mace-Lande Status: Critical
CORNELIA'S ECLECTUS PARROT *Eclectus roratus cornelia*
Mace-Lande Status: Endangered
Project Title: **Conservation of the parrots of Sumba.**
Project Aim: To prevent further decline in numbers of endemic parrot taxa on Sumba, and to protect their remaining habitat, and in particular nesting sites.
Justification: The cockatoo population on Sumba is thought to have declined by 80 % between 1986 and 1989, due to trade, and between 800 and 7,000 remain. On-going trade threaten this distinctive subspecies with extinction. Additionally, this and the majority of other endemic bird taxa are seriously threatened by on-going clearance of forest, which now covers less than 16% of the island.
Project Description: Protection of the largest remaining forest areas on Sumba, especially Manepeu, and the implementation of the forest conservation strategy for Sumba (ICBP 1992) is urgently

required, and trapping of parrots, including the endangered cockatoo and Eclectus Parrots must be brought under control. The development of a protection infrastructure for Manepeu, including the training of wardens and building and equipping of ranger posts.
Budget: Category C
Literature: ICBP 1992a, Jones & Marsden, in press.
Notes: During 1992, research on the endemic birds of Sumba, including the parrots, was carried out by Manchester Metropolitan University. ICBP, in cooperation with PHPA, BAPPENDA and the BUPATI, plans to implement a project in 1993 that will define boundaries for protected areas and develop a conservation awareness campaign. In addition to the parrots, Sumba has a number of other endangered bird species, including one of the world's most endangered hornbills, *Rhyticeros everetti*.

TANIMBAR CORELLA *Cacatua goffini*
Mace-Lande Status: Critical/Endangered
Project Title: **Status assessment of the parrots of the Tanimbar Islands.**
Project Aim: To assess the status and ecology of endemic parrots on the Tanimbar Islands, and to promote the gazettment of the proposed reserve on Yamdena Island.
Justification: Only 4,400 km^2 in extent, the Tanimbar archipelago has two endemic parrot species. Both species have been trapped and traded in very large numbers during the last decade: in excess of 100,000 Tanimbar Corellas have been recorded in trade.
Project Description: In the absence of adequate monitoring it is not known how parrots on Tanimbar have been affected by intensive trapping pressure. Surveys are therefore essential to ascertain status and to study ecological needs, prior to formulating management plans. The gazettement of the proposed reserve on Yamdena is essential to safeguarding this species, and should be expedited by the collection of data on threats, habitat status and land use.
Budget: US $ 70,000
Literature: ICBP 1992b
Notes: Tanimbar Corella was placed in CITES Appendix I in 1992. The endemic **Blue-streaked Lory** *Eos reticulata* (Endangered/ Vulnerable) and **Riedel's Eclectus Parrot** *Eclectus roratus riedeli* (Vulnerable/Endangered) are sympatric and in need of field survey work. The lory is traded in significant numbers. ICBP are planning surveys on Tanimbar in late 1992.

SANGIHE HANGING PARROT *Loriculus catamene*
Mace-Lande Status: Critical/Extinct
RED-AND-BLUE LORY *Eos histrio*
Mace-Lande Status: Endangered/Critical
BLUE-NAPED PARROT *Tanygnathus lucionensis talautensis*
Mace-Lande Status: Endangered
Project Title: **Conservation of parrots on Sangihe and the Talaud Islands.**
Project Aim: To ascertain the status and habitat requirements of parrots on Sangihe, Siao, Nenusa and Karakelang, as a preliminary to formulating conservation management plans.
Justification: Virtually nothing is known of the Sangihe Hanging Parrot, endemic to Sangihe, but recent searches suggest that very few, if any, remain. The three subspecies of Red-and-Blue Lory

are restricted to a few small islands. The nominate subspecies, of Sangihe and Siao, may already be extinct, whilst the population of *E.s.talautensis* is thought to be less than 2000. The status of *E.s.challengeeri* is unknown.
Project Description: Surveys and ecological studies should be conducted to assess the present status of these species on all the four islands. Plans for the conservation and management of these species should be drawn up. The gazettment and protection of proposed reserves on Karakelang Island should be a priority.
Budget: Category B
Literature: Collar & Andrew 1988, Bishop 1992
Notes: Intensive searches on Sangihe Island, and a brief survey of Salebabu in 1986 failed to locate any Red-and-Blue Lories, though the species survives on Karakelang (J.Taylor, in litt., 1991). The import of over 60 individuals of this species into Singapore in 1992 gives cause for concern (S.Nash pers. comm.). The Blue-naped Parrot is widely distributed but threatened throughout its range.

MOLUCCAN COCKATOO *Cacatua moluccensis*
Mace-Lande Status: Endangered/Critical
PURPLE-NAPED LORY *Lorius domicellus*
Mace-Lande Status: Endangered
Project Title: **Survey and Conservation of the Parrots of Seram.**
Project Aim: To ascertain the habitat requirements and distributional range of the parrots on Seram, and to assess the degree of protection afforded to the viability of parrot populations within Manusela National Park.
Justification: Seram and its satellite islands have three endemic parrot species: Moluccan Cockatoo, Purple-naped Lory and **Blue-eared Lory** *Eos semilarvata* (Vulnerable) as well as several endemic parrot subspecies. The Moluccan Cockatoo declined rapidly due to heavy trapping during the last decade, and despite legal protection, is still trapped in unknown numbers. The other native parrot taxa are also affected by this problem to various degrees.
Project Description: All of Seram's native parrots occur in Manusela National Park (1,800 km^2), which covers *ca.* 10% of the island, though the most important remaining populations of the Moluccan Cockatoo may be outside the park. A survey of the Moluccan Cockatoo and other parrots throughout Seram is one priority, whereas increased protection of Manusela, including increased patrolling and the prevention of trapping in the park, are also necessary. An assessment of the protection afforded to cockatoos by the park should be made, and if found insufficient, alternative areas should be proposed for protection. An awareness campaign among the villagers in the region should be initiated in an attempt to reduce trapping levels.
Budget: Category C
Literature: Bowler & Taylor 1989, Taylor 1991, 1992.

WHITE COCKATOO *Cacatua alba*
Mace-Lande Status Endangered
CHATTERING LORY *Lorius garrulus* (3 subspecies)
Mace-Lande Status: Endangered
Project Title: **Conservation of Parrots in the North Moluccas.**
Project Aim: To identify suitable areas where viable populations of White cockatoo can be protected, to assess the effects of logging, and to make provisions for sustainable trade in north Moluccan parrots.

Justification: Populations of both White Cockatoo and some subspecies of Chattering Lory have been overexploited for trade for a number of years. Although populations are not yet critically low, they may become so if measures are not implemented to control trade, and to set aside suitable areas to protect viable parrot populations. There are several proposed reserves in the north Moluccas, but none of them may provide adequate protection to the White Cockatoo in the long-term, because of altitude and topography.
Project Description: Comprehensive surveys should be carried out on Halmahera and Morotai, and further surveys conducted in parts of Obi and Bacan (some surveys were carried out in 1991/1992), with the aim of identifying areas for protection that would safeguard viable populations of endemic parrots, in particular of White Cockatoo. Proposed reserves should be targeted for initial surveys. A long-term research and population monitoring project, perhaps initially involving a PhD, is recommended as a prerequisite to setting sustainable quotas for parrots in the north Moluccas, and to assess the affects of current logging practices on breeding and food resources. An investigation into whether sustainable trade in North Moluccan parrots is feasible given the difficulties of policing and monitoring the trade should also be undertaken.
Budget: Category C
Literature: Lambert 1992b
Notes: The Violet-necked Lory *Eos squamata riciniata* (Vulnerable) is also trapped in significant numbers. Three subspecies of Chattering Lory are distributed throughout the north Moluccan islands, whilst the White Cockatoo is confined to Halmahera and Bacan. The Indonesian Government imposed a zero capture quota on White Cockatoo in 1992, but is likely to set a quota for 1993.

SULAWESI YELLOW-CRESTED COCKATOO *Cacatua sulphurea sulphurea*
Mace-Lande Status: Endangered
Project Title: **Survey of the Sulawesi Yellow-crested Cockatoo on Sulawesi.**
Project Aim: To ascertain the numbers
Justification: Trade figures suggest that this subspecies of the Sulawesi Yellow-crested Cockatoo is still trapped in significant numbers, although now undoubtedly very uncommon. Only a single sighting of the cockatoo has been reported on Sulawesi since 1982, and the location of remaining populations is unknown.
Project Description: Surveys, and an investigation of trade levels, are required throughout Sulawesi. Existing reserves may not protect populations of this species: hence proposals to safeguard remaining populations may be necessary
Budget: US $20,000 for surveys
Notes: The conservation of other subspecies of *C. sulphurea* are addressed by other proposed projects.

LESSER SUNDA YELLOW-CRESTED COCKATOO *Cacatua sulphurea parvula*
Mace-Lande Status: Endangered
WALLACES HANGING PARROT *Loriculus flosculus*
Mace-Lande Status: Endangered/Vulnerable
Project Title: **Surveys and Conservation of parrots in the Lesser Sunda Islands**

Project Aim: To conduct population and habitat surveys wand to identify key sites for the protection of endemic parrot taxa in the Lesser Sunda Arc (from Bali to Wetar).
Justification: Within Indonesia, the Lesser Sundas have been subjected to some of the highest levels of habitat destruction and degradation. The parrots of this island chain are in general poorly known, in particular the Lesser Sunda Yellow-crested Cockatoo, which is subjected to significant levels of trade. This species is now considered rare to very rare throughout its range, and it is unknown if, or where, viable populations survive.
Project Description: Surveys should be conducted on all the major islands in the Lesser Sundas (except Sumba: the subject of another project), particularly in existing and proposed reserves, to ascertain the conservation needs of the various species, and to identify key sites and management options for their conservation. The major output of the surveys should be a management strategy encompassing all the threatened parrot taxa in these islands, and proposals for protected areas, if deemed necessary, should be submitted to the Indonesian Government.
Budget: US $60,000 for comprehensive surveys.
Notes: The surveys and management strategy should involve all parrot taxa in the Lesser Sundas, in particular threatened subspecies of the **Rainbow Lorikeet** *Trichoglossus haematodus* (in particular *mitchellii, weberi, djampeanus, stresemanni* and *forsteni*), **Iris Lorikeet** *Trichoglossus iris*, Timor Red-winged Parrot *Aprosmictus jonquillaceus* and the Timor subspecies of the Great-billed Parrot *Tanygnathus megalorynchos hellmayri*. Mitchell's Lory *T. h. mitchellii* has apparently not been seen recently on Bali despite attempts to find it, but it survives on at least one site on Lombok.

BLACK-WINGED LORY *Eos cyanogenia*
Mace-Lande Status: Endangered
Project Title: **Conservation of the Black-winged Lory**
Project Aim: To ensure stable populations of the Black-winged Lory and sympatric parrots and develop a management plan for the reserves on Biak and Pulau Supiori.
Justification: The islands in the Geelvink Bay of Irian Jaya are an important centre of bird endemism. The Black-winged Lory, which is restricted to Biak, Supiori and three small satellite islands is thought to have a relatively small world population which, if current estimates are correct, may not sustain the presently high trapping rates. More than 1.300 birds exported in 1989 and in 1990.
Project Description: A survey should be undertaken on all islands where the Black-winged Lory occurs, and detailed field investigations initiated, to allow adjustment of capture quotas to sustainable levels. An assessment of the reserve system in the region should be made and a management plan drawn up especially for the important Supiori reserve, which is thought to be the stronghold of the species.
Budget: Category C for surveys and detailed field studies.
Literature: Thomsen *et al.* 1992
Notes: Other parrots of conservation concern on Biak are the **Biak Black-capped Lory** *Lorius lory cyanuchen* (Vulnerable) and **Rosenberg's Lory** *Trichoglossus haematodus rosenbergii*. (Vulnerable).

Philippines

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in:[1]	RECOMMENDATIONS					
		W	T	S	M	R	H
CRITICAL							
Cacatua haematuropygia	E	Y		Y	Y		Y
Loriculus philippensis chrysonotus (Extinct ?)	E	#	Y	Y		#	
L. p. siquijorensis	E		Y	Y	#		
ENDANGERED							
Prioniturus luconensis	E	#		Y	#		
Prioniturus discurus	E	#	Y	Y	#		
Prioniturus verticalis	E	#		Y	Y		
Prioniturus waterstradti	E	#	Y	Y	Y		Y
Tanygnathus lucionensis	Indo, Mal Is			Y	Y		Y
Loriculus philippensis bournsi *L.p. mindorensis* *L.p. panayensis* *L.p.regulus* *L.p. dohertyi*	E	#	Y	Y	#		
VULNERABLE							
Trichoglossus johnstoniae	E	#		Y	Y		
Prioniturus platanae	E	#		Y	#		
Prioniturus montanus	E	#	Y	Y	#		

[1] E = Endemic.
Recommendations: Y in Recommendations columns indicates that action is recommended for: W-Recovery Workshop; T-Taxonomy; S-Field Survey; M-*In Situ* Management; H-Husbandry Research; R-Recovery Efforts. # Pending results of field survey, taxonomy or husbandry research.
Indo = Indonesia, Mal Is = Malaysian islands off north Borneo

RED-VENTED COCKATOO *Cacatua haematuropygia*
Mace-Lande Status: Critical
BLUE-NAPED PARROT *Tanygnathus lucionensis*
Mace-Lande Status: Endangered
Project Title: **Protection and recovery of the Red-vented Cockatoo.**
Project Aim: To safeguard Cockatoo habitat, and to protect populations of this species and the Blue-naped Parrot from trappers.
Justification : The Red-vented Cockatoo is now extinct over as much as 90% of its range as a result of habitat destruction and trapping. Trapping, and possibly disease, now threatens the immediate survival of the species in much of its range. The last stronghold, the Palawan Province, supports between 800 and 3,000 birds. Populations there are increasingly becoming isolated. Palawan is probably also the last major stronghold for the Blue-naped Parrot, which is also heavily trapped.
Project Description: A programme, in cooperation with the Department of Environment and Natural Resources, should be developed to protect nest and roosting sites of cockatoos and Blue-naped Parrots from bird trappers. A major conservation awareness campaign should form an essential component of the programme. Further surveys should be conducted to identify potential sites for conservation activities. Clarification is

needed of whether Newcastle Disease or Psittacine Beak and Feather Disease has been introduced into the cockatoo population in St. Pauls Subterranean National Park (A. de Dios, pers. comm., 1991) and what impact they may be having. Twelve Red-vented Cockatoos in two shipments of wild-caught birds imported to the USA were infected with PBFD.
Budget: Category C
Literature\References: Lambert 1992c, R. van Oosten *in litt.* 1992, M. Boussekey *in litt.* 1992, B. Tabaranza *in litt.* 1992.
Notes: The Red-vented Cockatoo was added to CITES Appendix I in 1992, though few birds are legally exported. Cockatoo surveys were conducted on Palawan, the Sulu Islands and parts of Mindanao in 1991. Many other areas were surveyed in other parts of the species range in 1992 (with funds from the Zoological Society for the Conservation of Species), but few cockatoos were found. Successful breeding of Red-vented Cockatoos in captivity is reported in Manila, where *ca.* 20 pairs are held in captivity, and at several European institutions. A conservation poster on this species is being distributed with funding from St Martin-la-Plaine Zoo, France, and a collaborative conservation programme involving the zoo and the Philippine Department of the Environment and Natural Resources is planned.

CEBU HANGING PARROT *Loriculus philippensis chrysonotus*
Mace-Lande Status: Critical/Extinct
SIQUIJOR HANGING PARROT *L.p.siquijorensis*
Mace-Lande Status: Critical
Project Title: **Conservation of critically endangered subspecies of the Philippine Hanging Parrots in the Philippines.**
Project Aim: To ascertain the status in the wild, and taxonomic status of Philippine Hanging Parrots on Cebu and Siquijor.
Justification: Both subspecies are very distinctive small-island endemics, and populations may number less than fifty or a hundred individuals.
Project Description: Surveys should be conducted to establish the population sizes and habitat requirements of these two subspecies as a prerequisite to formulating management plans, if deemed necessary.
Budget: Category A for survey work.
Notes: Five additional subspecies of *Loriculus philippensis* are tentatively assigned to the Endangered/Vulnerable category. As several of these seven threatened subspecies may be full species, taxonomic research is urgently required. A small number of *L.philippensis* were observed on Cebu in 1992 (though whether they were the native subspecies is unresolved), but none during a brief visit to Siquijor, though locals report that *Loriculus* still occurs on the latter island (R.Timmins and G.Dutson, pers. comm. 1992).

BLUE-WINGED RACKET-TAIL *Prioniturus verticalis*
Mace-Lande Status: Endangered
MINDANAO MOUNTAIN RACKET-TAIL *Prioniturus waterstradti*
Mace-Lande Status: Endangered
Project Title: **Study of Philippine Racket-tail Parrots.**
Project Aim: To assess the ecology and conservation needs of Racket-tails in the Philippines and develop a conservation strategy for the genus.

Justification: The Philippines are the centre of Racket-tail diversity, with six of the nine know species being endemic to the country. They inhabit, and are often restricted to, completely different habitat types, ranging from mangroves to montane forests and the distribution. All the Philippine Racket-tails are threatened, and they are among the least studied of all parrots. Habitat destruction in the Philippines is proceeding rapidly.
Project Description: A comparative study of the ecology and status of all species is required as a prerequisite to drawing up and implementing a conservation strategy for the genus in the Philippines. The project might best be carried out as a doctorate at one of the Philippine universities.
Budget: Category B for the PhD study.
Literature: Dickinson *et al.* 1991
Notes: In addition to the Blue-winged Racket-tail and Mindanao Mountain Racket-tail, the other species to be covered are **Green Racket-tail** *Prioniturus luconensis* (Endangered/Vulnerable), **Blue-crowned Racket-tail** *P. discurus* (Endangered/Vulnerable), **Blue-headed Racket-tail** *P. platenae* (Vulnerable) and **Montane Racket-tail** *P. montanus* (Vulnerable).

India

The following taxa are of conservation concern.

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in: [1]	RECOMMENDATIONS					
		W	T	S	M	R	H
CRITICAL: None							
ENDANGERED: None							
VULNERABLE							
Psittacula eupatria magnirostris	E*		Y	Y	?		
Psittacula colomboides	E			Y	#		
Psittacula derbiana (? Safe)	China	#		Y	#		
Psittacula caniceps	E**	#		Y	#		

China

The following taxa are of conservation concern.

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in: [1]	RECOMMENDATIONS					
		W	T	S	M	R	H
CRITICAL: None							
ENDANGERED: None							
VULNERABLE							
Psittacula derbiana (? Safe)	India	#		#	Y		

[1] E = endemic
Recommendation: Y in Recommendations columns indicates that action is recommended for: W-Recovery Workshop; T-Taxonomy; S-Field Survey; M-*In Situ* Management; H-Husbandry Research; R-Recovery Efforts. # Pending results of field survey, taxonomy or husbandry research.
* Andaman Islands ** Nicobar Islands

Africa

See also the "Africa-wide Lovebird Project", section VII.I.

The following table covers several African countries that have one or two threatened taxa: Zim = **Zimbabwe**, Tan = **Tanzania**, Zam = **Zambia**, Mal = **Malawi**, Nam = **Namibia**, Moz = **Mozambique**, Ghan = **Ghana**, Lib = **Liberia**, [Ken] = introduced **Kenya**.

		RECOMMENDATIONS					
THREATENED TAXA, BY MACE-LANDE CATEGORY	**Taxon occurs in:** [1]	**W**	**T**	**S**	**M**	**R**	**H**
CRITICAL: None							
ENDANGERED							
Agapornis fischeri	Tan (E) [Ken]	#		Y	Y		
Agapornis nigrigenis	Zam, Zim, Nam	#		Y	Y		
Agapornis swinderniana swinderniana[*]	Ghan, Lib			Y			
VULNERABLE							
Agapornis lilianae	Zam, Zim, Mal, Tan, Moz			Y			

E = endemic. [*] A.s. swinderniana may not be Endangered.
Recommendations: Y in Recommendations columns indicates that action is recommended for: W-Recovery Workshop; T-Taxonomy; S-Field Survey; M-*In Situ* Management; H-Husbandry Research; R-Recovery Efforts. # Pending results of field survey, taxonomy or husbandry research.

Zambia

BLACK-CHEEKED LOVE-BIRD *Agapornis nigrigenis*
Mace-Lande: Endangered
Project Title: **An investigation of the status of the Black-cheeked Lovebird.**
Project Aim: To ascertain the present distribution of the species, to identify and evaluate all threats limiting the population's recovery, and to prepare a conservation strategy.
Justification: The Black-cheeked Lovebird *Agapornis nigrigenis* is Africa's most endangered parrot. Heavy trapping for the bird trade in the 1930's is suspected to have caused the species' initial decline. Black-cheeked Lovebirds are now believed extinct in Zimbabwe, and their continuing existence in the Caprivi strip of Namibia is unconfirmed. It is now known to survive only in Zambia.
Project Description: Surveys are recommended, particularly in Zambia, to assess the present-day distribution and abundance of the Black-cheeked Lovebird. The condition of the habitat should also be assessed. A comparison of former and present-day range of the species former and present should be made, as a necessary step in identifying the critical threats to the species. Evidence of hybridisation and trapping should also be investigated.
Budget: Category B
Literature: Collar & Stuart 1985
Notes: The factors limiting the recovery of the Black-cheeked Lovebird remain largely speculative, though various reasons, ranging from habitat alteration to continuing illegal trapping, have been suggested. Hybridisation with introduced populations of

Nyasa Lovebird *Agapornis lilianae* has also been mentioned as an additional threat.

Tanzania

FISCHER'S LOVE-BIRD *Agapornis fischeri*
Mace-Lande: Endangered
Project Title: **An investigation of the status and ecology of Fischer's Lovebird.**
Project Aim: To ascertain the present distribution of the species, to ascertain sustainability of trade levels, to identify other threats limiting the population size, and to prepare a conservation strategy and recommendations regarding trade in the species.
Justification: Fischer's Lovebird *Agapornis fischeri* is endemic to the northern half of Tanzania. Heavy trapping for the bird trade in the recent decade is suspected to have caused serious population decline. This species was identified as a priority species by the CITES Review of Significant Trade in animals listed in Appendix II of CITES (Anon. 1992a).
Project Description: Surveys are recommended, followed by longer-term biological studies, to assess the present-day distribution and abundance of Fischer's Lovebird and the impact of past trade on population levels. Exact habitat requirements and condition of the habitat should also be assessed.
Budget: Category C
Literature\References: Anon. 1992a, A. Bräutigam, pers. comm. 1992.
Notes: Although heavily traded in the past, Tanzania imposed a voluntary trade ban on the species in 1992.

South Africa

CAPE PARROT *Poicephalus robustus*
Mace-Lande: Endangered
Project Title: **Developing a conservation plan for the Cape Parrot.**
Project Aim: To halt the decline in population size of the Cape Parrot
Justification: The Cape Parrot is endemic to a narrow coastal strip in eastern South Africa, where it is declining due to illegal trapping, shooting and, to a lesser extent, habitat loss. As few as 1,000 may survive. This is the only endemic parrot species of South Africa.
Project Description: A study is needed to seek solutions to the problems threatening the long-term survival of the Cape Parrot. Field work on the Cape Parrot has already started in the Cape Province, but needs expansion to cover the entire distributional range of the species.
Budget: Category B

Notes: *Poicephalus robustus* is treated here as a separate species. Mitochondrial DNA studies to clarify its taxonomic status are presently being conducted in South Africa (A. Kemp. pers. comm.).

Caribbean

Dominica

IMPERIAL AMAZON *Amazona imperialis*
Mace-Lande Status: Critical
RED-NECKED AMAZON *Amazona arausiaca*
Mace-Lande Status: Endangered
Project Title: **Conservation of Imperial and Red-necked Amazons.**
Project Aim: To fully secure the future of both species, through establishment and management of a National Park.
Justification: Both Imperial Amazon and Red-necked Amazon populations are at critically low levels, being *ca.* 80 and *ca.* 300 respectively.
Project Description: Efforts to establish the proposed Morne Diablotin National Park should be of top priority, since the long-term survival of these two species will be largely dependent on the continued existence of the intact forest in this proposed protected area. On-going studies of the two species, including an investigation of detailed habitat requirements and population demography, are necessary to devise management plans for their conservation. Methods of protecting crops from damage by Red-necked Amazon should also be investigated.
Budget: $700,000 for park establishment over three years, plus $50,000 per year for research.
Literature\References: Evans 1991, Collar *et al.* 1992, Varty & Charles unpubl., P. Butler *in litt.*, 1992.
Notes: The endemic parrots of Dominica have been the focus of surveys and ecological studies since 1975. A multi-disciplinary conservation programme coordinated by the Forestry Division of Dominica and ICBP, is presently being implemented. This includes the implementation of a management plan, now in preparation. Major funding (close to $ 700,000) will be needed over the next three years to establish the proposed National Park. ICBP is negotiating the provision of the necessary financial resources. The RARE Centre for Bird Conservation and the World Parrot Trust are the main supporters of the on-going conservation education programme on the island.

St Lucia

ST LUCIA AMAZON *Amazona versicolor*
Mace-Lande Status: Endangered
Project Title: **Conservation of the St Lucia Amazon.**
Mace-Lande Status: Critical/Endangered
Project Aim: To ensure the long-term success of the recovery of the St Lucia Amazon, to safeguard existing habitat and to provide additional habitat.
Justification: Although recent action has benefitted the St Lucia Amazon, and led to a substantial increase in numbers (250-350 individuals), the population is still endangered because of the threat of continuing habitat loss and hurricanes.
Project Description: A study of the ecology of the St Lucia Amazon, particularly in relation to breeding and feeding, and

interactions with Pearly-eyed Thrashers *Margarops fuscatus*, will be the next important step in the on-going conservation efforts. Baseline data thus collected might be used in a hands-on management of habitat to promote further population recovery. The phasing out of certain plantations in favour of reversion to natural forest is of high priority, since it will reduce disturbance to nesting birds.
Budget: Funding secured through SAFE (the fund-raising appeal of the Jersey Wildlife Preservation Trust).
Literature\References: Jeggo & Anthony 1991, Butler 1991, Collar *et al.* 1992., D. Jeggo *in litt.*, 1992, P. Butler *in litt.*, 1992.
Notes: Recent action by governmental and non-governmental agencies have resulted in population recovery, so that the species is now considered relatively secure. Conservation eduction on St Lucia is funded by the RARE Centre for Bird Conservation and the World Parrot Trust. A successful captive breeding programme has been established by the Jersey Wildlife Preservation Trust.

St Vincent

ST VINCENT PARROT *Amazona guildingii*
Mace-Lande Status: Endangered
Project Title: **Conservation of the St Vincent Parrot.**
Project Aim: To ensure the long-term survival of the St Vincent Parrot.
Justification: Although the species is relatively secure, with 450-500 individuals, the population is still considered as critically threatened because of the threat of continuing habitat loss and hurricanes.
Project Description: Continued monitoring of the wild parrot population, and strong enforcement of CITES so that illegally held birds can be returned to St Vincent whenever requested by the government, are among the measures needed to maintain the relatively secure status of the St Vincent Amazon at present. Vehicles for patrol work are urgently needed. Additional training in animal husbandry and a strengthening of the *A. guildingii* consortium and support for the environmental awareness and education programme of the Forestry Division are also recommended. More detailed ecological studies are also required, particularly with regard to the exact habitat requirements of the species.
Budget: Category C
Literature\References: Butler 1988, Collar *et al.* 1992., P. Butler *in litt.*, 1992, D. Jeggo *in litt.*, 1992.
Notes: Recent action by governmental and non-governmental agencies have resulted in population stability, so that the species is now considered relatively secure. The captive breeding programme on St. Vincent (which relies on confiscated birds and in 1992 held 29 specimens), run by the Forest Division, has been successful in raising 12 young over a period of five years. This programme also functions as a valuable environmental education and public awareness resource.

Puerto Rico

PUERTO RICAN AMAZON *Amazona vittata*
Mace-Lande Status: Critical
Project Title: **Recovery of the Puerto Rican Amazon**
Project Aim: To assist the recovery of Puerto Rican Amazons, though protection and management of the existing population, and the establishment of a second population.
Justification: The wild population of Puerto Rican Amazons is critically low, with only about 40 birds, and restricted to a single site in the Luquillo Mountains.
Project Description: The ongoing conservation programme, which includes 1) intensive conservation management of the wild population, 2) cross-fostering of chicks between wild and captive parrots and 3) increasing efforts to enhance breeding success of captive pairs, needs to continue at least until a wild population consisting of several hundred birds is securely established at two separate localities in Puerto Rico, including Río Abajo, where reintroduction should also be attempted. The US Fish and Wildlife Service should establish a Recovery Team under the Endangered Species Act to coordinate the conservation programme for this species.
Budget: Funding secured through the US Fish and Wildlife Service.
Literature: Snyder *et al.* 1987, Collar *et al.* 1992.
Notes: A captive breeding population, established in 1970, now consists of more than 60 birds. The Puerto Rico Department of Natural Resources and US Forest Service have contributed greatly to the conservation programme.

Cayman Islands

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in: [1]	RECOMMENDATIONS					
		W	T	S	M	R	H
CRITICAL: None							
ENDANGERED: None							
Amazona leucocephala hesterna	E	Y	Y		Y		
VULNERABLE							
Amazona leucocephala caymanensis	E	Y	Y		Y		

[1] E = endemic
Recommendations: Y in Recommendations columns indicates that action is recommended for: W-Recovery Workshop; T-Taxonomy; S-Field Survey; M-*In Situ* Management; H-Husbandry Research; R-Recovery Efforts. # Pending results of field survey, taxonomy or husbandry research.

CAYMAN BRAC PARROT *Amazona leucocephala hesterna*
Mace-Lande-Status: Endangered
Project Title: **Conservation of the Cayman Brac Parrot.**
Project Aim: To prevent further decline of the Cayman Brac Parrot and ensure its genetic purity.
Justification: Despite a reasonably successful conservation effort, only 300 to 400 Cayman Brac Parrots remain, and are still threatened by various factors, including the persecution of individuals that damage crops.

Project Description: Over the next five years the conservation programme should aim to 1) ensure the protection of more parrot habitat, 2) determine whether cats pose a major threat and to what degree control of cats is needed (feral cats should be removed from parrot nesting areas, if necessary) 3) continue monitoring and study of the parrots' status and ecology 4) find a solution to the release or escape of pet parrots which threaten the health and genetic integrity of native taxa and 5) investigate ways of protecting crops from damage by parrots.
Budget: Category C
Literature\References: Butler *in litt.* 1992, Wiley *et al.* 1992
Notes: The conservation education programme of The National Trust and RARE Centre for Bird Conservation, and the recent transfer of the Bluff Reserve on Cayman Brac from The Nature Conservancy to The National Trust, provide a solid basis for further conservation efforts.

Jamaica

The following taxa are of concern.

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in:[1]	RECOMMENDATIONS					
		W	T	S	M	R	H
CRITICAL: None							
ENDANGERED: None							
VULNERABLE							
Aratinga nana nana	E	#	Y	Y	Y		
Amazona collaria	E	#		Y	Y		
Amazona agilis	E	#		Y	Y		Y

Cuba

The following taxa are of conservation concern.

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in: [1]	RECOMMENDATIONS					
		W	T	S	M	R	H
CRITICAL: None							
ENDANGERED: None							
VULNERABLE							
Aratinga euops	E	#		Y	Y		

[1] E = endemic
Recommendations: Y in Recommendations columns indicates that action is recommended for: W-Recovery Workshop; T-Taxonomy; S-Field Survey; M-*In Situ* Management; H-Husbandry Research; R-Recovery Efforts. # Pending results of field survey, taxonomy or husbandry research.

Bahamas

Support and encouragement should be given to the Bahama Government to establish a National Park in southern Abaco that would afford protection to the Abaco Parrot *Amazona leucocephala bahamensis*
References: Butler *in litt.*, 1992.

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in: [1]	RECOMMENDATIONS					
		W	T	S	M	R	H
CRITICAL: None							
ENDANGERED: None							
VULNERABLE							
Amazona leucocephala bahamensis	E	Y	Y		Y		

Dominican Republic and Haiti

The following taxa are of conservation concern.

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in: [1]	RECOMMENDATIONS					
		P	T	S	M	R	H
CRITICAL: None							
ENDANGERED: None							
VULNERABLE							
Aratinga chloroptera	E	#		Y	Y		
Amazona ventralis	[Puerto Rico]	Y	Y	Y	Y		

[Puerto Rico]: introduced.

Netherlands Antilles

The following taxa are of conservation concern.

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in: [1]	RECOMMENDATIONS					
		W	T	S	M	R	H
CRITICAL: None							
ENDANGERED:							
Amazona barbadensis (? Vulnerable)	Venezuela	Y	Y	Y	Y		
VULNERABLE: None							

Recommendations: Y in Recommendations columns indicates that action is recommended for: P-PHVA; T-Taxonomy; S-Field Survey; M-*In Situ* Management; H-Husbandry Research; R-Recovery Efforts.
Pending results of field survey, taxonomy or husbandry research.

Central America

Mexico

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in:[1]	RECOMMENDATIONS					
		W	T	S	M	R	H
CRITICAL: None							
ENDANGERED							
Ara militaris mexicana (? Vulnerable)	E		Y	Y	Y		
Rhynchopsitta terrisi	E	Y		Y	Y		
Rhynchopsitta pachyrhyncha (? Vulnerable)	E	Y		Y	Y		Y
Amazona oratrix	Belize	#		Y	Y		
Amazona viridigenalis	E	Y			Y		
VULNERABLE							
Aratinga breviceps	E		Y	Y	Y		
Amazona farinosa guatemalae	Belize, Hond, Guat			Y	Y		

[1] E = Endemic.
Recommendations: Y in Recommendations columns indicates that action is recommended for: W-Recovery Workshop; T-Taxonomy; S-Field Survey; M-*In Situ* Management; H-Husbandry Research; R-Recovery Efforts. # Pending results of field survey, taxonomy or husbandry research.
Hond = Honduras, Guat = Guatemala

GREEN-CHEEKED AMAZON *Amazona viridengalis*
Mace-Lande Status: Endangered
YELLOW-HEADED AMAZON *Amazona oratrix* (subspecies *oratrix, magna, tresmariae*)
Mace-Lande Status: Endangered
Project Title: **Conservation of Amazon parrots in Mexico.**
Project Aims: To stop the population decline of Mexico's two most threatened *Amazona* species.
Justification: Both the Green-cheeked Amazon and the Yellow-headed Amazon have declined greatly due to trade and habitat destruction. Trapping, especially of Yellow-headed Amazons, and illegal exportation continues despite an export ban since 1982 and Mexico's recent adhesion to CITES. There are no areas in Mexico where the Yellow-headed Amazon is protected. The Green-cheeked Amazon occurs in the El Cielo Biosphere Reserve, but is still declining there. Some landowners are interested in protecting both species, but lack expertise.
Project Description: Two projects are currently underway. The first is a comparative study of the ecology and reproductive biology of the two species and the partially sympatric Red-lored Amazon *Amazona autumnalis*. Patterns of forest fragmentation are being assessed from satellite images. This project is supported by grants from WWF-US, TRAFFIC-US and the U.S. Fish and Wildlife Service. The second project, funded by the Center for the Study of Tropical Birds (CSTB) includes an education campaign and a nest-box erection scheme at Los Colorados Ranch, Tamaulipas, were small populations of both species survive. Both projects involve collaboration with counterparts at the Universidad Autonoma de Tamaulipas and Mexican authorities. These efforts need to continue and should be expanded to win the support of other ranchers and

local inhabitants for protecting the parrots and their habitat. Furthermore, a conservation plan for both species throughout their range in Mexico, including the Tres Marias Islands subspecies of the Yellow-headed Amazon, needs to be developed.
Budget: Category C
Literature\References: Collar *et. al.* (1992), E. Enkerlin (*in litt.*, 1992)

MAROON-FRONTED PARROT *Rhynchopsitta terrisi*
Mace-Lande Status: Endangered
Project Title: Conservation of the Maroon-fronted Parrot
Project Aims: To protect critical habitat for the Maroon-fronted Parrot and develop plans for logging schemes that are compatible with the species' needs.
Justification: The Maroon-fronted Parrot *Rhynchopsitta terrisi* is Mexico's most endangered parrot species. Based on surveys in the late seventies, its population is generally assumed to be around 2,000, but simultaneous counts at nine sites in September 1991 found only 600 birds.
Project Description: A long-term conservation programme is needed for this species, which should aim to 1) protect large tracts of forest, especially around Highrise cliff, 2) reafforest certain zones like the Cerro del Potosi and Las Cuevas, and 3) conduct research to determine whether logging can be made compatible with the requirements of the species, 4) reactivate protection of the Cumbres de Monterrey National Park and 5) initiate an ecological education campaign. The Profauna group of the Universidad Autonoma Agraria Antonio Narro in Saltillo and grassroots conservation organisations in Monterrey should be involved.
Budget: Category C
Literature\References: Collar *et. al.* (1992), Gomez-Garza (1991), E.C. Enkerlin, *in litt.* 1992.
Notes: The main threat to this species is destruction of its mixed-conifer forest habitat by fire, logging and clearance for agriculture. The large Cumbres de Monterrey National Park exists within the Maroon-fronted Parrot's range, but even within it tree clearance occurs at a rate which may soon render its value as a protected area worthless.

Panama

The following taxa are of concern

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in:[1]	RECOMMENDATIONS W	T	S	M	R	H
CRITICAL: None							
ENDANGERED: None							
VULNERABLE							
Ara ambigua (? Endangered)	Ecuador, Col, Cen Am	#	Y	Y	Y		
Pyrrhura picta eisenmanni	E	#		Y	Y		
Touit costaricensis (? Safe)	Costa Rica	#	Y	Y	Y		Y
Pionopsitta pyrilia	Venezuela, Col	#		Y	Y		Y

[1] E = endemic.
Recommendations: Y in Recommendations columns indicates that action is recommended for: W-Recovery Workshop; T-Taxonomy; S-Field Survey; M-*In Situ* Management; H-Husbandry Research; R-Recovery Efforts. # Pending results of field survey, taxonomy or husbandry research.
Col = Colombia, Cen Am = Central America (Nicaragua, Costa Rica, Honduras)

Honduras and Nicaragua

The following taxa are of conservation concern.

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in: [1]	RECOMMENDATIONS W	T	S	M	R	H
CRITICAL: None							
ENDANGERED: None							
VULNERABLE							
Ara ambigua (?Endangered)	Col, Ecu, Pan, Cos	Y	Y	Y	Y		

Costa Rica

The following taxa are of conservation concern.

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in: [1]	RECOMMENDATIONS W	T	S	M	R	H
CRITICAL: None							
ENDANGERED: None							
VULNERABLE							
Touit costaricensis (? Safe)	Panama	#	Y	Y	Y		Y
Ara ambigua (?Endangered)	Col, Ecu, Pan, Cos	Y	Y	Y	Y		

[1] E = endemic
Recommendations: Y in Recommendations columns indicates that action is recommended for: W-Recovery Workshop; T-Taxonomy; S-Field Survey; M-*In Situ* Management; H-Husbandry Research; R-Recovery Efforts. # Pending results of field survey, taxonomy or husbandry research.
Col = Colombia, Ecu = Ecuador, Pan = Panama, Cos = Costa Rica.

South America

Brazil

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in:[1]	RECOMMENDATIONS					
		W	T	S	M	R	H
CRITICAL							
Anodorhynchus glaucus (Extinct?)	Par, Ur, Arg	#		Y		#	
Anodorhynchus leari	E			Y		Y	Y
Cyanopsitta spixii	E	#		Y		Y	Y
Pyrrhura perlata coerulescens (Extinct in the wild?)	E	#		Y	#		
Amazona brasiliensis	E	Y			Y		
ENDANGERED							
Anodorhynchus hyacinthinus	Bol, Par			Y	Y		Y
Pionus menstruus reichenowi	E	#	Y	Y	Y		
Pyrrhura leucotis griseipectus	E	#		Y	Y		
Amazona rhodocorytha	E	Y		Y	Y		
Amazona vinacea[2] (? Vulnerable)	Arg, Par	#		Y	Y		
Amazona pretrei[2] (? Vulnerable)	Arg, Par?, Ur?	Y		Y	Y		
Amazona ochrocephala xantholaema (? Vulnerable)	E	#	Y	Y	#		
VULNERABLE (BRAZIL)							
Ara maracana	Par, Arg			Y	Y		
Guaruba (Aratinga) guarouba	E	Y		Y	Y		
Aratinga auricapilla	E	#	Y	Y	Y		
Pyrrhura cruentata	E	Y		Y	Y		
Pyrrhura leucotis leucotis, P.l.pfrimeri,	E	#		Y	Y		
Touit melanonotus	E	#		Y	Y		Y
Touit surda	E	#	Y	Y	Y		Y
Pionopsitta pileata (? Safe)	Par, Arg	#		Y	Y		
Amazona autumnalis diadema	E		Y	Y			
Triclaria malachitacea	Arg?	#		Y	Y		Y

[1] E = Endemic.
Recommendations: Y in Recommendations columns indicates that action is recommended for: W-Recovery Workshop; T-Taxonomy; S-Field Survey; M-*In Situ* Management; H-Husbandry Research; R-Recovery Efforts. # Pending results of field survey, taxonomy or husbandry research.
Arg = Argentina, Par = Paraguay, Ur = Uruguay, Bol = Bolivia
[2] A research and conservation project for these two species has been initiated by CNPq and PUC-RS in collaboration with ICBP, with additional major funding from San Diego Zoo and Los Palmitos Park.

SPIX'S MACAW *Cyanopsitta spixii*
Mace-Lande Status: Extinct/Critical
Project Title: Reintroduction and Recovery of Spix's Macaw
Project Aim: To prevent the extinction of Spix's Macaw in the wild, and to promote rapid population recovery.
Justification: With only one known bird remaining in the wild, and at least 27 in captivity spread over three continents, Spix's Macaw is one of the most endangered parrot species.
Project Description: The on-going field project of IBAMA, which is investigating the ecology of Spix's Macaw, has attempted to locate more wild birds and has encouraged involvement of the local community in conservation efforts, should be fully supported. A PHVA was carried out in Brazil in October 1992. The workshop recommended that reintroduction, probably involving two birds, should take place in late 1993. Although it is considered of high priority to establish, finally, whether further Spix's Macaws occur in the wild, this now seems unlikely . Major efforts are needed to increase the presently very low rate of captive reproduction, to study the species' ecological needs and to prepare ground for an eventual re-establishment of the species in the wild. An assessment of the extent of *Caraiba* gallery forest, and the initiation of protection efforts for remaining habitat, is necessary as a prerequisite to any reintroduction. Botanical studies are also essential in view of the paucity of information on exact habitat requirements, and the possible need for habitat management. The possibility of purchasing important areas of *Caraiba* should also be considered.
Budget: Field Programme $70,000 per year
Note that this does not include any captive breeding element. Loro Parque has raised funds for some captive breeding components.
Literature\References: Collar *et al*. 1992, C. Munn *in litt*., 1992
Notes: The Brazilian Government has set up an International Recovery Committee for Spix's Macaw. Some $ 33,000 were obtained to carry out monitoring of the one known wild bird, search for other possibly surviving populations and environmental education in 1992. Twenty-seven birds are held by members of the consortium, of which three pairs are reportedly breeding.

LEAR'S MACAW *Anodorhynchus leari*
Mace-Lande Status: Critical
Project Title: **Recovery of Lear's Macaw**
Project Aim: To promote a population increase to a minimum of 1,000 individuals in the wild.
Justification: The Lear's Macaw has been one of the world's rarest parrots for a long time. Its present known population is about 70 birds in the wild and six in captivity. The recruitment rate is extremely low, and inbreeding depression may be occurring.
Project Description: During October 1992, a Recovery Workshop for Lear's Macaw was held in Belo Horizonte, Brazil. The participants recognised the paramount importance of continued research into various aspects of biology of the species, and support for this research should be of highest priority. Recommendations for active management that urgently needs undertaking include the mapping all *licuri* palm stands, fencing off key areas, and planting seedlings chiefly of *licuri* palm but also of other food plants. In the long-term, the aim of this habitat management is to assure a continued and more abundant food supply, but in the meantime, artificial feeding should be considered until newly planted seedlings start

to fruit. The establishment of artificial nest holes should also be considered.
As part of the recovery programme, monitoring and wardening should be increased to prevent disturbance of the birds and illegal capture attempts. The on-going education and public awareness programmes, necessary to achieve the support and sympathy of local communities for the conservation of the species and its habitats, should also be fully supported. Surveys in the Cachoeira do Rio Preto region may be worthwhile in view of local claims of a second type of blue macaw there.
Six birds are known to exist in captivity in various places around the world. Efforts to maximize their reproductive and genetic potential should be made, but the workshop recommended that further wild birds should not be captured.
The workshop further recommended that a Permanent Committee for the Recovery of Lear's Macaw under the leadership of IBAMA (the Government authority responsible for the conservation of wild flora and fauna in Brazil) should be created, to oversee all activities relating to the birds in the wild and in captivity.
Budget: Category C.
Literature\References: Machado & Brandt 1990, Collar *et al.* 1992., Anon. 1992c, A. Munn *in litt.*, 1992.
Notes: A detailed plan for land acquisition and/or the establishment of reserves, including the Ecological Station, has been developed (by Machado & Brandt 1990). Organisations, which hade major input in the conservation of the species so far include, apart from IBAMA, Fundacao Biodiversitas, WWF-US and Conservation International.

RED-TAILED AMAZON *Amazona brasiliensis*
Mace-Lande Status: Critical
Project Title: **Conservation of Red-tailed Amazon.**
Project Aim: To halt the species' rapid decline and ensure its survival
Justification: The population of Red-tailed Amazon, thought to be relatively stable with *ca.* 3,000 birds in 1988, is now in rapid decline. Numbers are estimated to have declined by a third, to about 2,000 in 1992 (P. Scherer Neto *in litt.* 1992). Trapping for the pet trade and shooting are major problems, with 356 birds taken from the wild in the municipality of Cananeia alone in 1991/1992, whilst the loss of nest-trees to boat builders is another serious threat.
Project Description: Regular monitoring of all the significant remaining populations of the species, and a major public awareness and education programme for guards and local inhabitants are both urgently required. Vigilance against poaching, hunting and cutting of trees should be increased in and around all the twelve protected areas within the range of the species, and the tiny but important Ilha do Pinheiro should be included in the adjacent Superagui National Park.
Budget: Category C
Literature: Collar *et al.* 1992, Scherer Neto 1988, Scherer Neto & Martuscelli 1992
Notes: It is recommended that the Parrot Study Group of the Brazilian Ornithological Society be closely involved in this project.

RED-BROWED AMAZON *Amazona rhodocorytha*
Mace-Lande Status: Endangered
REICHENOW'S BLUE-HEADED PARROT *Pionus menstruus reichenowi*
Mace-Lande Status: Endangered
Project Title: **Conservation of Parrots in Brazil's Atlantic Forest Region**
Project Aim: To secure the survival of numerous threatened parrot taxa endemic to eastern Brazil.
Justification: The Atlantic Forest region has a large number of threatened endemic parrots, and although some key sites for their protection have been identified, the present status and distribution of most of these parrots is poorly known, especially in the northern half of the region.
Project Description: The Red-browed Amazon's most pressing need is for the location and immediate protection of additional remnant forest areas within its range. A major survey to identify the key sites for the conservation of parrot populations ranging from the eastern part of Minas Gerais in the south, to Ceara in the north is therefore the most pressing priority. The taking of nestlings and capture and shooting of adult birds may be reduced by an education campaign in the areas adjacent to the breeding sites. The extent to which illegal trapping and other potential problems threaten the species particularly with regard to birds which feed outside of existing protected areas, should be assessed by a study of parrots in Sooretama Reserve. More specifically, it is important that CVRD continue to recognize the biological importance of its Porto Seguro Reserve in Bahia and give it total protection, and that the authorities in Rio de Janeiro state take the necessary steps to protect the forests where the species has been recorded that lie outside existing park boundaries, i.e. at Desengano State Park and on Ilha Grande.
Budget: Category C
Literature: Collar *et al.* 1992
Notes: Parrot to be covered by this project in addition to Red-browed Amazon, Reichenow's Blue-headed Parrot and Blue-chested Parakeet include **Vinaceous Amazon** *Amazona vinacea* (Endangered/Vulnerable), **Golden-capped Conure** *Aratinga auricapilla* (Vulnerable), **Golden-tailed Parrotlet** *Touit surda* (Vulnerable) and subspecies of the **White-eared Parakeet** *Pyrrhura leucotis* (Vulnerable). For two species, the Red-browed Amazon and the **Blue-chested Parakeet** *Pyrrhura cruentata* (Vulnerable) Sooretama Reserve and the adjacent CVRD Linhares Reserve is known to be a stronghold, but illegal trapping may still be a problem.

HYACINTH MACAW *Anodorhynchus hyacinthinus*
Mace-Lande Status: Endangered
Project Title: **Conservation of the Hyacinth Macaw.**
Project Aim: To prevent further decline of the species
Justification: During the last two decades, numbers of the Hyacinth Macaw have been seriously reduced by massive illegal trade, from an estimated 100,000 to no more than 3,000 at present.
Project Description: About half of the remaining population survives in the Pantanal, mainly on private ranch land. In recent years the Hyacinth Macaw has become a symbol for the Pantanal's fragile ecosystem among the Brazilian public. Many ranch owners no longer allow trapping on their properties and do not cut down food-trees of the species. However, nest-trees are still often cleared for the sake of cattle and illegal trapping remains a problem in some areas. Strict enforcement of legal bans on trade,

and various related action, is needed to save the species in each of its three known main areas.
A continuing effort is therefore needed (1) to increase the already existing sensitivity to the needs of the Hyacinth Macaw (and other native wildlife), among ranch owners and the general public in the Pantanal, (2) to assist ranchers in improving protection from illegal trappers and (3) to find solutions to the problem of nest-trees. An IBAMA/WCI programme that is assessing the effectiveness of experimentally erected nest-boxes should also continue. Of eleven boxes hung in 1992, one contained a three-month old nestling in October 1992. Munn *et al.* (1987) also suggests that management and replanting of the species's food-trees should be undertaken. Surveys are also needed to ascertain the status of the species outside the Pantanal, especially in certain areas of Para, southern Piaui, north-western Minas Gerais and the extensive region of south-eastern Mato Grosso.
Budget: Category B
Literature\References: Munn *et al.* 1987, Collar *et al.* 1992., Munn *in litt*, 1992.
Notes: Hyacinth Macaw is protected under Brazilian law, has been listed on Appendix I of CITES since 1987, and is banned from export in all countries of origin. One of the other parrots that would receive attention during the proposed survey is the **Goias White-eared Parakeet** *Pyrrhura leucotis pfrimeri*, which is one of Brazil's least known Psittacines.

CEARA WHITE-EARED PARAKEET *Pyrrhura leucotis griseipectus*
Mace-Lande Status: Endangered
Project Title: **Developing a Conservation Plan for the Ceara White-eared Parakeet**
Project Aim: To assess the status of the Ceara White-eared Parakeet and its habitat, and to develop a management plan for its conservation.
Justification: The Ceara White-eared Parakeet *Pyrrhura leucotis griseipectus* has a very small range, being known only from two 'forest islands', Serra do Baturite and Serra Negra, within a semi-arid region. Serra do Baturite in Ceara State is being deforested to make way for coffee plantations, whilst Serra Negra in south central Pernambuco is a forest patch of less than 900 ha.
Project Description: A survey of the subspecies and its habitat should be carried out to identify management options for the remaining habitat in the Serra do Baturite and evaluate options to protect the Serra Negra forest patch.
Budget: Category A, for survey and management plan development.
Literature\References: C. Yamashita (*in litt.*, 1992)

Argentina

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in:[1]	RECOMMENDATIONS					
		W	T	S	M	R	H
CRITICAL							
Anodorhynchus glaucus (?Extinct)	Braz, Par, Uru	#		y		#	
ENDANGERED							
Amazona pretrei (? Vulnerable)	Braz, Par, Uru?	Y		Y	Y		
Amazona vinacea	Braz, Par	#		Y	Y		
VULNERABLE							
*Ara militaris boliviana** (? Safe)	Bolivia		Y	Y			
Ara maracana	Braz, Par			Y	Y		
Pionopsitta pileata (? Safe)		#		Y	Y		
*Triclaria malachitacea**	Braz	#		Y	Y		Y

[1] E = Endemic.
Recommendations: Y in Recommendations columns indicates that action is recommended for: W-Recovery Workshop; T-Taxonomy; S-Field Survey; M-*In Situ* Management; H-Husbandry Research; R-Recovery Efforts. # Pending results of field survey, taxonomy or husbandry research.
* Occurrence in Argentina needs confirmation

GLAUCOUS MACAW *Anodorhynchus glaucus*
Mace-Lande Status: Extinct/Critical
Project Title: **Search for the Glaucous Macaw.**
Project Aim: To search for extant populations of the Glaucous Macaw
Justification: Although usually considered extinct, there is the remote chance that a small population of this species still survives.
Project Description: A careful survey of all rivers and gallery forest, initially in Argentina, and later in northern **Uruguay** and the remoter regions of southern **Brazil** from Rio Grande do Sul north through Santa Catarina to Paraná is essential to establish whether populations of this species survive. Remoter marshland areas of northern and western Corrientes, Argentina, where rich stands of palm, particularly the chatay, may still perhaps occur should also be considered for searching. If populations are discovered, they are likely to be small and critically endangered: conservation planning and protection will therefore be urgently required.
Budget: $20,000 for initial survey work.
Literature: Collar *et al.* 1992.

Venezuela and Colombia

Venezuela

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in:[1]	RECOMMENDATIONS					
		W	T	S	M	R	H
CRITICAL: None							
Aratinga acuticaudata neoxena (? Endangered)	E		Y	Y	Y		
ENDANGERED							
Hapalopsittaca amazonina	Colombia	Y		Y	Y		Y
Amazona barbadensis (? Vulnerable)	Netherlands Antilles	Y	Y	Y	Y		
VULNERABLE							
Pionopsitta pyrilia	Panama Colombia	#		Y	Y		Y

[1] E = Endemic.
Recommendations: Y in Recommendations columns indicates that action is recommended for: W-Recovery Workshop; T-Taxonomy; S-Field Survey; M-*In Situ* Management; H-Husbandry Research; R-Recovery Efforts. # Pending results of field survey, taxonomy or husbandry research.

RUSTY-FACED PARROT *Hapalopsittaca amazonina*
Mace-Lande Status: Endangered
Project Title: **Conservation of the Rusty-faced Parrot in Colombia and Venezuela.**
Justification: All three subspecies of the Rusty-faced Parrot, confined to Colombia and Venezuela, are very local throughout their ranges, very rare at most localities, and threatened by habitat destruction, especially in Venezuela.
Project Description: Research should be carried out on the distribution and ecology of the species to clarify whether the existing protected area system is adequate to ensure the survival of all subspecies. Preparation of a long term management plan and protection of Sierra Nevada National Park is also needed. Unprotected forests in the Andes need identifying and require urgent protection, not only for this species, but also for the 25 other endemic birds found there (ICBP 1992).
Budget: Category C
Literature\References: Collar *et al.* 1992, Desenne and Strahl 1991, A. Luy (CIPA) *in litt.*, 1992.
Notes: Of the three subspecies, one is endemic to Colombia, one (*H. a. amazonina*) occurs mainly in Colombia, and ranges marginally into Venezuela, and the third (*H. a. theresae*) is endemic to Venezuela. The two protected areas of relevance to the species in Venezuela, Tama National Park (which possibly has a population of *H. a. amazonina*) and Sierra Nevada National Park (the only conservation area in existence for *H. a. theresae*) are among the most threatened in the country. In Colombia the species is recorded from protected areas, such as Chingaza National Park, Purace National Park and Cueva de los Guacharos National Park, but it is not known whether it frequents these areas only seasonally.

Colombia

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in:[1]	RECOMMENDATIONS					
		W	T	S	M	R	H
CRITICAL							
Ognorhynchus icterotis	(Ecuador ?extinct)	#		Y		Y	
Hapalopsittaca fuertesi	E	Y		Y	Y		Y
ENDANGERED							
Ara ambigua (? Vulnerable)	Cen Am, Ecuador	Y	Y	Y	Y		
Leptopsitta branickii	Ecuador, Peru	#		Y	Y		
Pyrrhura calliptera		#		Y	Y		
Bolborhynchus ferrugineifrons		#		Y	Y		Y
Hapalopsittaca amazonina		Y		Y	Y		Y
VULNERABLE							
Pyrrhura melanura chapmani (? Safe)	E		Y	Y	#		
Pyrrhura picta caeruleiceps P.p.subandina, P.p.pantchenkoi	E	#		Y	Y		
Touit stictoptera (? Safe)	E			Y	#		
Pionopsitta pyrilia	Panama, Venezuela	#		Y	Y		Y

[1] E = Endemic.
Recommendations: Y in Recommendations columns indicates that action is recommended for: W-Recovery Workshop; T-Taxonomy; S-Field Survey; M-*In Situ* Management; H-Husbandry Research; R-Recovery Efforts. # Pending results of field survey, taxonomy or husbandry research.
Cen Am = Central America (Nicaragua to Colombia)

YELLOW-EARED CONURE *Ognorhynchus icterotis*
Mace-Lande Status: Critical
Project Title: **The Conservation of the Yellow-eared Conure and its Habitat.**
Project Aims: To locate surviving populations of Yellow-eared Conures and aid the recovery of the species.
Justification: The Yellow-eared Conure has declined to a population thought to number less than one hundred, and its specific habitat requirements make it particularly vulnerable.
Project Description: An intensive search for surviving Yellow-eared Conures is now urgently needed, followed by detailed studies of the ecology and behaviour of the species. The search might include parts of north-west **Ecuador**. Based on ecological data, a species recovery programme should be developed, following a Recovery Workshop. The establishment of a wax palm (*Ceroxylum quindiuense*) forest reserve and education campaign in the region of Toche, Colombia, is an essential first step to conserving one known remaining population. Large-scale propagation of the wax palms and their reintroduction in certain areas is also recommended.
Budget: **$370,000**, of which $110,000 is already pledged in Colombia.
Literature: Kelsey & Renjifo 1991, Collar *et al.* 1992.
Notes: A project proposal for the conservation of the cloud forest and the wax palm forests of the central Andes of Colombia has been developed by ICBP and Fundación Herencia Verde. The proposal already pledged, also provides for the conservation of the

endangered **Rufous-fronted Parakeet** *Bolborhynchus ferrugineifrons*, whilst the surveys could be combined with searches for the critical endangered **Azure-winged Parrot** *Hapalopsittaca fuertesi*. The endangered **Golden-plumed Conure** *Leptosittaca branickii* also occurs in this zone and would benefit from the programme.

AZURE-WINGED PARROT *Hapalopsittaca fuertesi*
Mace-Lande Status: Critical
Project Title: **Survey and Ecological Studies of Azure-winged Parrot.**
Project Aim: To safeguard the populations of Azure-winged Parrot.
Justification: The species is known to survive only in the Reserve Acaime del Alto Quindio, where the population is thought to be less than one hundred. In other parts of its potential range, habitat loss is severe.
Project Description: Highest priority should be given to support for the Alto Quindío, where the ecology of Azure-winged Parrot, especially in respect of feeding and breeding, should be researched, and every step taken to ensure optimum management to maximize the population there. The possibility that the species occurs in the Los Nevados National Park (and the adjacent Navarco Nature Reserve) should be investigated, and appropriate management should follow if it does. The remnant patch of forest in which it may have been sighted in 1980 and adjacent habitat should also be investigated and protected. A Recovery workshop should also be considered.
Budget: See under Yellow-eared Conure.
Literature: Graves & Uribe Restrepo 1989, Ridgely 1981, Collar *et al.* 1992.
Notes: The finding of Rusty-faced Parrots *Hapalopsittaca amazonina velezi* in the central Andes of Colombia in 1969 and later years may indicate that the Azure-winged Parrot has been replaced or displaced by the former. Survey and ecological study can be combined with the project for Yellow-eared Conure, and is thus already budgeted for. Institutional support for Fundación Herencia Verde (see above) will assist in maintenance of their Acaime reserve.

Ecuador and Peru

Ecuador

See also "The conservation of the Yellow-eared Conure and its habitat" (Page 98).

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in:[1]	RECOMMENDATIONS W	T	S	M	R	H
CRITICAL							
Ognorhynchus icterotis (extinct in Ecuador ?)	Colombia	#		Y		#	
Hapalopsittaca pyrrhops	Peru	Y		Y	Y		Y
ENDANGERED							
Leptosittaca branickii	Colombia, Peru	#		Y	Y		
Pyrrhura orcesi	E	#		Y	Y		
Pyrrhura albipectus (? Vulnerable)	E	#	Y	Y	Y		
Amazona autumnalis lilacina	E	Y	Y	Y	Y		
VULNERABLE							
Ara ambigua	Cen Am, Colombia	Y	Y	Y	Y		
Aratinga erythrogenys (? Safe)	Peru			Y			
Brotogeris pyrrhopterus	Peru	#		Y	Y		
Touit stictoptera	Colombia, Peru			Y	#		

Cen Am = Central America (Nicaragua to Panama)

Peru

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in:[1]	RECOMMENDATIONS W	T	S	M	R	H
CRITICAL							
Hapalopsittaca pyrrhops	Ecuador	Y		Y	Y		Y
ENDANGERED							
Leptosittaca branickii	Colombia Ecuador	#		Y	Y		
VULNERABLE							
Aratinga mitrata alticola (? Safe)	E		Y	Y			
Aratinga erythrogenys (? Safe)	Ecuador			Y			
Forpus xanthops	E	#		Y	Y		
Brotogeris pyrrhopterus	Ecuador	#		Y	Y		
Brotogeris cyanoptera gustavi	E	#		Y	Y		
Touit stictoptera	Ecuador Colombia			Y	#		
Hapalopsittaca melanotis	Bolivia	#		Y	Y		Y

[1] E = Endemic.
Recommendations: Y in Recommendations columns indicates that action is recommended for: W-Recovery Workshop; T-Taxonomy; S-Field Survey; M-*In Situ* Management; H-Husbandry Research; R-Recovery Efforts. # Pending results of field survey, taxonomy or husbandry research.

RED-FACED PARROT *Hapalopsittaca pyrrops*
Mace-Lande Status: Critical
GOLDEN-PLUMED PARAKEET *Leptosittaca branickii*
Mace-Lande Status: Endangered
Project Title: **Conservation of the Red-faced Parrot, and the protection of Podocarpus National Park.**
Project Aim: To safeguard known populations of the Red-faced Parrot, and to locate additional populations.
Justification: The Red-faced Parrot is local in distribution and seriously threatened in Ecuador and Peru. Fewer than 500 individuals are thought to exist. Podocarpus National Park supports the largest known population of the Red-faced Parrot, and a significant population of the Golden-plumed Parakeet.
Project Description: More effective protection of Podocarpus National Park, Ecuador, is needed, and it is of paramount importance that planned mining activities in the park (which would do irreversible damage) by the Norwegian company ECUANOR are prevented. Efforts should be made to protect the forest patch between Selva Alegre and Manu in the Chilla mountains. In **Peru,** surveys are required to assess whether viable populations of the species survive, and what options for their conservation exist.
Budget: Category C
Literature: Bloch *et al.* 1991. Collar *et al.* 1992
Notes: Podocarpus National Park is considered to be one of the most species-rich national parks in the world, with many globally threatened species occurring there, and is probably the single most important site to ensure the survival of the parrots above, and also the **White-breasted Parakeet** *Pyrrhura albipectus* (Endangered\Vulnerable). A public awareness and environmental education campaign has already been initiated, and Fundacion Natura, has drawn up an emergency plan for short-term protection and is developing a management plan for Podocarpus National Park.

LILACINE AMAZON *Amazona autumnalis lilacina*
Mace-Lande Status: Endangered
Project Title: **Developing a conservation plan for the Lilacine Amazon and its habitat**
Project Aim: To assess the status of the Lilacine Amazon and sympatric parrots, and to develop a management plan for the conservation of these species and their habitat.
Justification: During the ICBP Parrot CAMP workshop in January 1992, the Lilacine Amazon was identified as the taxon with possibly the lowest population of all mainland *Amazona* taxa. It is threatened by habitat loss and illegal trapping.
Project Description: A study of the distribution and ecological requirements of the Lilacine Amazon and sympatric psittacines should be carried out, as well as an investigation of the status of the habitat and threats to these species. A management plan to conserve these parrots, in the forests on the Pacific slopes of west central Ecuador should then be developed. Preliminary survey work by Corparacion Ornitologia del Ecuador (CECIA) started in 1992 with funding from the Institut fuer Papageienforschung and the Zoological Society for the Conservation of Species.
Budget: Category B
Literature: Sousa 1987
Notes: Three other parrot taxa of conservation concern, the **Grey-cheeked Parakeet** *Brotogeris pyrrhopterus* (Vulnerable), **Red-masked**

Conure *Aratinga erythrogenys* (Vulnerable) and **Buffon's Macaw** *Ara ambigua* (Vulnerable/Endangered), are partially sympatric with the Lilacine Amazon, and would benefit from this project. The Lilacine Amazon is a distinctive subspecies of the Red-lored Amazon (endemic to West Central Ecuador): based on plumage and possibly habitat specialisation it may represent a separate species.

Bolivia

The following taxa are of conservation concern.

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in: [1]	RECOMMENDATIONS W	T	S	M	R	H
CRITICAL: None							
ENDANGERED							
Anodorhynchus hyacinthinus	Braz, Par	Y		Y	Y		Y
VULNERABLE							
Ara glaucogularis[2]	E	#		Y	#		
Ara militaris boliviana (? Safe)	Argentina?		Y	Y			
Ara rubrogenys[3]	E	Y			Y		
Miopsitta monachus luchsi	E	#		Y	#		
Hapalopsittaca melanotis (? Safe)	E	#		Y	Y		Y

[1] E = endemic
Recommendations: Y in Recommendations columns indicates that action is recommended for: W-Recovery Workshop; T-Taxonomy; S-Field Survey; M-*In Situ* Management; H-Husbandry Research; R-Recovery Efforts. # Pending results of field survey, taxonomy or husbandry research.
Braz = Brazil, Par = Paraguay
[2] A study of the species by Wildlife Conservation International was launched in 1992 and will continue in 1993.
[3] Two projects are planned to assist conservation of this species; one a collaborative effort of Danish biologists and a Bolivian NGO (Associacion Boliviana para la Proteccion de las Aves); the second a project involving Santa Cruz University and St-Martin-la-Plaine Zoo.

Paraguay

The following taxa are of conservation concern.

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in:[1]	RECOMMENDATIONS W	T	S	M	R	H
CRITICAL							
Anodorhynchus glaucus (extinct?)	Arg, Urug, Braz	#		Y		#	
ENDANGERED							
Anodorhynchus hyacinthinus	Bolivia, Braz	Y		Y	Y		Y
Amazona pretrei (? Vulnerable)	Braz, Arg, Urug	Y		Y	Y		
Amazona vinacea (? Vulnerable)	Braz, Arg	#		Y	Y		
VULNERABLE							
Ara maracana	Braz, Arg			Y	Y		
Pionopsitta pileata	Braz, Arg	#		Y	Y		

[1] E = endemic
Recommendations: Y in Recommendations columns indicates that action is recommended for: W-Recovery Workshop; T-Taxonomy; S-Field Survey; M-*In Situ* Management; H-Husbandry Research; R-Recovery Efforts. # Pending results of field survey, taxonomy or husbandry research.

Braz = Brazil, Urug = Uruguay, Arg = Argentina

Uruguay

The following taxa are of conservation concern.

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in:[1]	RECOMMENDATIONS					
		W	T	S	M	R	H
CRITICAL							
Anodorhynchus glaucus (extinct?)	Arg, Para, Braz			Y			
Amazona pretrei (? Vulnerable)	Braz, Arg, Para	Y		Y	Y		
ENDANGERED:							
VULNERABLE: none							

[1] E = endemic
Recommendations: Y in Recommendations columns indicates that action is recommended for: W-Recovery Workshop; T-Taxonomy; S-Field Survey; M-*In Situ* Management; H-Husbandry Research; R-Recovery Efforts. # Pending results of field survey, taxonomy or husbandry research.
Braz = Brazil, Para = Paraguay, Arg = Argentina

Chile

The following taxa are of conservation concern.

THREATENED TAXA, BY MACE-LANDE CATEGORY	Taxon also occurs in:[1]	RECOMMENDATIONS					
		W	T	S	M	R	H
CRITICAL: None							
ENDANGERED: None							
VULNERABLE							
Enicognathus leptorhynchus (? Safe)	E	#		Y	Y		
Cyanoliseus patagonus byroni	E				Y		

[1] E = endemic
Recommendations: Y in Recommendations columns indicates that action is recommended for: W-Recovery Workshop;T-Taxonomy; S-Field Survey; M-*In Situ* Management; H-Husbandry Research; R-Recovery Efforts.
Pending results of field survey, taxonomy or husbandry research.

Indian Ocean Islands

Mauritius

ECHO PARAKEET *Psittacula eques*
Mace-Lande Status: Critical
Project Title: **Recovery of the Echo Parakeet.**
Project Aim: To ensure the survival and recovery of the Mauritius Parakeet.
Justification: Only 15-20 Echo Parakeets survive on Mauritius, despite on-going intensive management. There are only four potentially reproductive pairs, and not all of these breed annually.
Project Description: Support for the existing project is required. The management of the wild population involves supplemental feeding, predator control around nests and the provision of artificial nest boxes. Small key areas of forest have been improved by the removal of exotic weeds, and further efforts of this type are needed. Work in progress aims to enhance the productivity of the wild birds. Research on the nutrition of birds in captivity is required to upgrade the captive breeding programme. In view of the slow recovery of the species and remaining vulnerability, a thorough review of additional conservation options, such as an intensive programme to control nest predators, might be considered.
Budget: US $ 35,000 per year.
Literature\References: Collar & Stuart 1985, Carl Jones *in litt.* 1992.
Notes: Four young birds, three harvested as eggs and the other as a chick from a failing nest, were brought into captivity during the 1991/1992 breeding season to start a captive breeding programme. It has been demonstrated that the parakeets may lay replacement clutches if the clutch of eggs or brood of young are lost or harvested. The extinct Parakeet from Réunion is considered to have been a subspecies of the Echo Parakeet. However, the translocation of birds to Réunion should not be seriously contemplated until a viable population has been built up on Mauritius or in captivity. Hunting pressure on Réunion would also pose a major problem for introduced Parakeets at the present time. Supporting organisations of the on-going project are the Jersey Wildlife Preservation Trust, World Parrot Trust, Mauritius Wildlife Appeal Fund and the Government of Mauritius.

Seychelles

SEYCHELLES BLACK PARROT *Coracopsis nigra barklyi*
Mace-Lande Status: Endangered
Project Title: **Conservation of Seychelles Black Parrot.**
Project Aim: To increase the population size of the Seychelles Black Parrot
Justification: Although the population of the Seychelles Black Parrot is stable at around 100 individuals, and much interest in its conservation exists in the Seychelles, it remains at high risk from genetic or stochastic events due to the low total numbers and presently very restricted distribution.

Project Description: A study should be undertaken to determine whether the habitat on the island of Praslin has reached carrying capacity, so that translocation of some birds to a second island should be considered, or whether growth of the parrot population is suppressed by other factors (notably nest site competition by introduced Indian Mynahs *Acridotheres tristis* or nest predation by rats).
Budget: Category B
Literature: Low 1984, Merrit *et. al.* 1986
Notes: *Coracopsis nigra sibilans* from the Comoro Island is closely related to the subspecies from the Seychelles and also considered to be of conservation concern.

V.VII Captive Breeding

No other conservation practice, except possibly 'sustainable utilisation' creates so much controversy as captive breeding. In a world where the number of persons dedicated to conservation is as limited as the funds available for this task, it is important that people from all disciplines work together, and this Action Plan therefore adopts a middle view between the extremes of viewpoints. This Action Plan advocates captive breeding programmes only where it is considered that such programmes can benefit conservation of the taxon in question, and if concurrent recovery programmes are also initiated. The following points have been considered in making recommendations:

a) When should breeding programmes be initiated ?

The IUCN Policy Statement on Captive Breeding (1987b) states that:

> *The vulnerability of small populations has been consistently underestimated. This has erroneously shifted the timing of establishment of captive populations to the last moment, when the crisis is enormous and when extinction is probable... Management to best reduce the risk of extinction requires the establishment of supporting captive populations much earlier, preferably when the wild population is still in the thousands.*

ICBP does not subscribe to a magic population level as to when captive breeding should be implemented, but suggests that each case needs to be considered and judged on its own merit (Imboden 1987).

Last minute intervention, when for example a population is known to have declined below 100 individuals (not all of which will be breeding), increases the risk of loosing a significant part of genetic diversity of a taxon, and may even lead to its extinction. This is particularly true if such action has to involve experimenting with the last few survivors of a species to develop a captive husbandry protocol.

As examples, the Dusky Seaside Sparrow *Ammodramus maritimus nigrescens* can be cited, which became extinct in 1987 because the decision to begin conservation efforts including captive breeding was taken too late (Erlich *et al.*, 1992). In contrast, the Socorro Dove *Zenaida graysoni* survives because, by chance, some birds were taken into captivity in the 1950's. There was no opportunity to implement conservation action, since the disappearance of this species in the wild between 1958 and 1978 went unnoticed (Collar *et al.* 1992)

b. Does captive breeding diminish the chances of saving a species wild habitat ?

It has been repeatedly argued that the existence of a captive breeding programme weakens efforts to conserve remaining wild populations or their habitats. However this argument is largely speculative and there is little evidence to support this view. To the contrary, *properly structured and publicised* captive breeding programmes with the potential to restock or reintroduce to the

wild have stimulated protection of remaining wild populations or restoration of habitat (Durrell *et. al.* 1987).

c. Can Captive breeding deflect resources from conservation in the field?

Although funding for the general operation of zoological institutions comes primarily from sources not normally available to conservation, some zoos, especially in the USA, now apply for funding for endangered species breeding programmes from conservation sources. Most *in situ* captive breeding programmes have certainly been funded with money which would potentially also be availble for field conservation. A few zoos, however, are already making financial contributions to parrot field conservation efforts, and the challenge must be to greatly step up such efforts.

d. Does captive breeding promote trade in wild-caught parrots?

Although collectors of rare parrots have often contrived to obtain threatened species under the guise of captive breeding programmes, there is no evidence to suggest that implementation of one of the existing *parrot breeding programmes with a conservation aim* (coordinated breeding programmes of the regional zoo organisations, official studbooks and official *in situ* breeding programmes) has increased legal or illegal trade in these species.

e. Disease risks

The existence of a number of cryptic, presently untreatable diseases (see also Appendix 3) has been a strong argument against captive breeding in multi-species facilities such as zoos. It has been argued that single species breeding facilities in the natural range of the species are the only acceptable alternative. Such a strategy, however, may result in competition for funds that might be allocated for field conservation efforts (see section C).

Unless restocking of the remnant wild population is anticipated in the early phase of a captive breeding programme, location of a breeding programme in multi-species institutions may still offer an adequate compromise between the disease risk and cost effectiveness. As these populations must be seen more as an insurance against the failure of other conservation efforts, restocking may never or only at some time in the future be necessary. It can be expected that screening (if not treatment) of many of the diseases of concern will become possible, and that techniques to infuse new genetic material into wild populations without the risk of disease will improve. Already, cross-fostering of eggs can prevent the spread of some diseases.

And finally, short-term and long-term disease risks must be considered, particularly in relation to the fact that, for many diseases, the disposition to become affected is hereditary. For such diseases, the genetic diversity in the gene pool of a healthy population ensures the survival of the taxon in an epidemic, since not all individuals succumb to the disease. However, in a small, inbred population, the chances of a larger percentage of the population or indeed the whole taxon succumbing to a single disease outbreak is much higher because of increased genetic uniformity. Therefore, the risk of disease exposure associated

with a management action such as captive breeding must be weighed against the increased disease vulnerability associated with loss of genetic diversity in small populations (Ralls *et al.* 1980, Jones *et al.* 1989). The latter could have as great or greater an impact on the long-term survival of a taxon than the former.

f. Domestication

Domestication, once in operation, is an irreversible modification of the gene pool of a taxon. However, the conclusion from one of the few research projects carried out to study the domestication process (Hemmer 1983) was that domestication is not the result of unavoidable genetic drift in captivity, but originates partly from intentional selection for favoured genetically-controlled morphological features, such as colour mutations, and - probably even more important - from (often unintentional) selection for greater stress resistance.

It follows that, if the stated aim of captive breeding programmes for conservation can be achieved (i.e. a high reproduction rate of the majority of wild caught founder animals, equal family size in following generations, low juvenile mortality and a generally low death rate from captivity- related factors), there would be limited opportunity for selection towards domestication to operate. In reality, few breeding programmes already achieve this goal. Indeed, a significant proportion of wild caught parrot specimens in captivity typically fail to breed because of stress related factors, such as aggression. This indicates that considerable selection for more stress tolerant (domesticated) strains may be occurring among various parrot taxa in captivity.

Certainly, the ongoing debate, on the one hand trying to play down or deny the potential risk of domestication in support of captive breeding, and on the other trying to play down or deny the potential risk of inbreeding and loss of genetic diversity in small or fragmented wild populations as an argument against captive breeding, is not helpful. Both risks are clearly there and the debate should move to a more constructive discussion as to what other options (in addition to captive breeding) there may be to counter the loss of genetic diversity in small wild populations, and how management to reduce selection for domestication in captive populations can be improved.

Conclusion

The summaries concerning captive breeding in this Action Plan reflect the different views expressed by members of the ICBP Parrot Group and represent a compromise between conflicting opinions:

> The conservation of most parrot taxa in the wild is the most desirable and feasible option, but the maintenance of captive populations is important for taxa for which future recovery efforts may include reintrodcution, or where loss of genetic diversity or a high extinction risk is a major concern.

Captive breeding should always be subordinate or complementary to conservation action in the field: even in the case of Spix's Macaw, efforts to protect and restore its habitat must proceed simultaneously to the captive breeding programme.

Captive breeding for conservation (with the aim of restocking or reintroduction, if the situation in the wild requires) should be restricted to taxa of considerable conservation concern. However, delaying such efforts until the last minute should be avoided, since this may greatly increase the extinction risk of the taxon.

Ex situ breeding programmes must be endorsed by one of the regional zoo coordination authorities, and should seek agreement with government agencies in the countries of origin.

Because of the disease risk, reintroduction or restocking from captivity needs extreme caution.

Recommendations to the Captive Breeding Community

1. Captive parrot populations should be managed in a coordinated way, and primarily for those listed in Tables 8 and 9 during the next five years. Other taxa of lesser priority were identified during the Parrot CAMP meeting (list available from CBSG).

2. Techniques that counter domestication and allow more successful breeding of threatened parrots and effective re-introduction to the wild, should be improved.

3. Captive breeding programmes should not be carried out in isolation, but should be part of an overall conservation strategy that includes field conservation. Assistance should be given in organising the necessary recovery workshops.

4. An attempt should be made to ensure that captive breeding programmes do not compete for funds from sources usually available for other types of conservation. Institutions participating in captive breeding programmes should be encouraged to find funds for complimentary field conservation efforts.

5. Coordinated breeding programmes for the taxa listed in Table 8 should be continued, improved or initiated by using stock that is already in captivity.

Captive breeding programmes which may aid conservation can be divided into three categories:

1. Those that seek to prevent the immediate extinction of a taxon by providing animals for reintroduction or restocking. Programmes for Spix's macaw, Orange-bellied Parakeet, Norfolk Island Red-crowned Parrot, Echo Parakeet, Puerto Rico Amazon, and perhaps for Coxen's Fig Parrot, Ouvea Horned Parakeet, Yellow-eared Conure and Kakapo if these programmes can be developed, belong in this category.

2. Those that provide an insurance against the failure of other conservation efforts in cases where extinction risk to a taxon in the wild is very high. Citron-crested Cockatoo, Red-vented Cockatoo and Red-tailed Amazon are obvious cases, whereas the placement of other taxa in either this or the next category is somewhat uncertain.

3. Those aiming to establish self-sustaining or surplus producing captive populations to reduce demand for wild caught birds. Generally, the taxa identified during the CAMP meeting, which are thought to fit best in this category are not listed in Tables 8 or 9 (the full list is available from CBSG), except genuine border cases and a few taxa such as Hyacinth Macaw, Blue-throated Macaw, Red-fronted Macaw or Golden Conure, which clearly can be saved without captive breeding, but where another upsurge in trade could seriously threaten the small remaining wild populations and such an upsurge is a distinct possibility, if trade demand can no longer be met by captive bred birds, as is at least partly now the case.

Explanations for captive breeding recommendations presented in Table 8 and Table 9.

Captive Population

The **Number in Captivity** column lists minimum estimates of animals in public collections (before the slash) and in private aviculture (behind the slash).

Captive Recommendations

The **Captive Recommendation** column lists levels of captive programmes recommended. These are as follows:

Recommendations which relate to the maintenance of a captive population do not, in the majority of instances, necessitate the acquisition of new stock from wild populations, since these already exist.

90/100 Maintain population sufficient to preserve 90 percent of the average heterozygosity of the wild gene pool for 100 years. Number depends on generation time of the taxon and size of founder population.

N Maintain a captive nucleus (>50-100 individuals) to always represent 98 percent of the wild gene pool. This type of programme may require periodic, but in most cases modest, immigration/importation of individuals from the wild population to maintain this high level of genetic diversity. In cases where the existing captive population size is less than 50 individuals (for example, as with the Caribbean Amazons), this recommendation should be interpreted as meaning that the existing captive birds be used to build up the captive population to the minimum requirement of 50 (see p. 8).

Existing Programme

I International programme already exists. These are programmes of the regional zoo coordination authorities (American Species Survival Plan, the Australian Species Management Programme, the European Endangered Species Programme, official studbook programmes, San Diego Zoo and Jersey Wildlife Preservation Trust Programmes).

R Existing *in-situ* captive breeding programmes

D *In situ* captive breeding programmes being developed

Table 8. Recommended captive breeding programmes for taxa with sufficient founder stock already in captivity.

Taxon	Captive Population	Captive Recommendation	Existing Programme
Eos cyanogenia	40/<400	N	
Eos reticulata	50/>2000	90/100	
Eos histrio talautensis	0/>125	N	
Trichoglossus hamatodus mitchellii	0/<100	N	
Lorius domicellus	>40/>200	N	
Lorius garrulus flavopalliatus	>200	90/100	
Lorius garrulus morotaianus	<100	90/100	
Vini peruviana	>20/10	N	I
Cacatua sulphurea sulphurea	50/>2000	90/100	
Cacatua sulphurea citrinocristata	50/>2000	90/100	I
Cacatua sulphurea parvula	?/>1000	90/100	
Cacatua moluccensis	>300/>10000	90/100	I
Cacatua haematuropygia	>25/>300	90/100	I
Tanygnathus lucionensis	>10/>100	N	
Eclectus roratus cornelia	0/>20	N	
Polytelis alexandrae	>100/>4000	N	
Psephotus chrysopterygius	>30/>200	90/100	I
Neophema chrysogaster	30	90/100	R
Anodorhynchus hyacinthinus	350/>3000	N	I
Cyanopsitta spixii	27	90/100	I
Ara glaucogularis	>30/>200	N	
Ara militaris mexicana	>100/>1000	N	
Ara ambigua	<50/>500	N	I
Ara rubrogenys	>100/>500	N	I
Guaruba guarouba	>200/500	N	I
Rynchopsitta pachyrhyncha	>250/>200	90/100	I
Pyrrhura perlata coerulescens	<20/>500	90/100	
Pyrrhura leucotis griseipectus	0?/<100	N	
Pionus menstruus reichenowi	0/<20?	N	
Amazona vittata	66/0	90/100	R
Amazona pretrei	<50/>200	N	
Amazona viridigenalis	>200/>5000	90/100	
Amazona autumnalis lilacina	<50/>500	N	I
Amazona brasiliensis	<30/>300	90/100	
Amazona rhodocorytha	>50/>300	90/100	
Amazona barbadensis	>40/>100	N	
Amazona oratrix (sspp. *oratrix* and *magna*)	<300/>1000	N	
Amazona vinacea	<30/<1000	N	
Amazona versicolor	18/0	N	I
Amazona arausiaca	<10/<10	N	R
Amazona guildingi	43/<100	N	R/I

Table 9. Recommended captive breeding programmes for taxa with insufficient founder stock in captivity.

Taxon	Captive Population	Captive Recommendation	Existing Programme
Cyclopsitta diophthalma coxeni	0/0	N	D[1]
Psittacula eques	4	90/100	R
Cyanoramphus novaezelandiae cooki	13	N	R
Eunymphicus cornutus uvaeensis	<15	N	
Ognorhynchus icterotis	0/0	90/100	
Strigops habroptilus	0/1	N	D[2]

[1] = Programme being developed by Currumbin Sanctuary, Australia (Spittall 1991).
[2] = Husbandry protocol being developed by Auckland Zoo and Department of Conservation, New Zealand.

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VII Appendices

Appendix 1. Estimating and Monitoring Parrot Population Sizes

Parrot population sizes have been estimated using a number of methods. These include counting from vantage points above the forest, roost counts, transect-counts and the use of Variable Circular Plots (VCP). Habitat-specific population density estimates obtained using the last three of these methods can be used as a basis for population size estimation, by extrapolation. In longer-term studies, radiotelemetry may also provide a useful means to assess ranging behaviour, and hence the fine-tuning of estimates of density and population size.

Methods based on VCP's or line transects require the estimation of observer-parrot distances, and all methods require confidence in identification skills. The importance of observer training, particularly with respect of estimating distances, has been stressed by Scott *et al.* (1985). Errors in distance estimation, even by observers trained to estimate distance, tend to lead to overestimates of density, typically by about 20% (Verner 1985). This can, to some extent, be overcome by the use of several observers, whose results are pooled, or by the extensive training recommended by Kepler and Scott (1981).

All methods are subject to bias, and surveyors should be aware of the sources of bias affecting the methodology that they are using. Sources of bias, as well as detailed description of survey methodologies, are described by Bibby *et al.* (1992). Other important considerations include sampling range and recording effort, both of which can seriously influence the accuracy of results. The exact methods and location of sites that are visited during surveys therefore need careful documentation.

Assessing absolute population size is usually much more difficult than conducting relative counts, since the former entails far more time and effort. Indeed, it is frequently impossible to count absolute numbers of psittacines. Whilst knowing absolute population sizes is often important, in many cases regular monitoring and the provision of relative counts may provide sufficient information to assess trends and conservation needs of psittacines. Whilst some of the methods below can, in theory, be employed to obtain absolute counts, they are most frequently likely to be used to make estimates of numbers which can them act as a baseline for future monitoring of population trends.

Counts from Vantage Points

Counts from vantage points have successfully been used to estimate parrot populations in a few areas, particularly in the Caribbean (Butler 1981, Lambert 1983, Evans 1991). In these cases, the steep terrain and deep valleys provide ideal conditions for both observing and monitoring parrots that are moving to and from roosts or food resources. The situation is also ideal because forest patches are relatively small, and the valley systems discrete. In situations where the terrain is less appropriate, it is only possible to monitor parrots by this method if, for instance, towers were built above the forest canopy, or in the canopy of emergent trees. In areas of low topography, such methodology is only worthwhile if long-term studies are being considered.

This method is probably inappropriate for surveys of parrots that range over very large areas, though it is a useful method to consider when population densities are so low that other methods are unlikely to detect birds despite a large investment in time (Lambert 1992b, 1992c).

Variable Circular Plots

In recent years the VCP method has been used to estimate population sizes of various psittacines in Indonesia (Lambert 1992b, Jones & Marsden in press, Marsden unpubl.). The method seeks to provide an instantaneous count of the number of a subject species within an area defined by the radius of the VCP. The main assumption of the method is that all birds at the point of observation (for example, above the observer) are detected. The VCP method is most appropriately used to determine population densities of animals that are not highly mobile.

For this reason, it is less appropriate for calculating densities of highly mobile species such as certain lories, parakeets or macaws, or for species that are cryptic and/or generally silent at rest. The critical measurement of the VCP method, the distance from the station to the animal in question, is an estimate for which a large error might be anticipated when dealing with species such as parrots that move rapidly, or may be difficult or impossible to see. It is important that distances are accurately estimated, since any errors are squared in subsequent density estimates.

Simulation studies by Scott and Ramsey (1981) indicated that mobility may seriously bias density estimates derived from VCP surveys, especially for counts of longer duration. The effect was relatively minor for slower moving species but substantial for those moving at least one effective detection radius during the period of the count.

At low population densities, the time taken to sample enough points to obtain sufficient data may preclude use of this methodology, and greater coverage by transects might be more appropriate.

Transects

Various types of transect methodology exist, though the most accurate estimates of population density relies on the estimation of subject distance from the transect. If subjects are merely placed in distance bands, less accurate population density estimates are derived.

Line transects could be used as a method to survey certain species of parrots, particularly those species which occur in more open habitats, such as in savannah. Lambert (1992b) suggests that line transect methods tend to underestimate parrot population density in rain forest, because parrots often sit quietly as an observer passes and are thus easily overlooked despite their often bright colours.

Whilst mobility may have preclude the use of VCP methodology, it is less of a problem when using transects. Failure to detect birds on or near the transect line can bias density estimates at least as much as movement (Verner 1985).

Aerial Surveys

Aerial survey counts, which are essentially transects, could be used to conduct surveys of conspicuous parrots such as white cockatoos (*Cacatua* spp.) in large forest blocks. Comprehensive ground surveys would need to be conducted simultaneously in order to assess the reliability of aerial surveys.

Counts at Congregations

Some species of parrot form communal roosts, or congregate at scarce resources. In most instances, counts at such locations are useful in making relative counts and assessing population trends, though in certain situations, population estimates of such species could be verified, modified, or indeed, based entirely on birds counted at such congregations.

In West Africa, for example, Grey Parrot *Psittacus erithacus* population densities have been estimated by counting birds at roosts (Dändliker 1992), whilst in Brazil, population monitoring of the threatened Red-spectacled Amazon *Amazona pretrei* has relied exclusively on roost counts (Collar *et al.*, in press). The difficulty of locating parrot roosts of this type, however, often preclude estimates of population size based on roosting birds alone, unless long-term studies are possible. A knowledge of range size is also essential if population estimates are to be made using data from roosts. For wide-ranging species, it may not be appropriate to census roost sites because sites may not be permanent.

In the Peruvian Amazon, macaw densities have been estimated by observing and identifying individual birds that congregate on banks of exposed clay (Munn 1992). Clay is a scarce resource in this region, that is apparently essential in the diet of macaws and other parrots. Hence macaws from a wide area are attracted to the few clay sources that are available, where they can be counted. The fact that macaws can be individually identified

from their face pattern, enables relatively accurate estimations of macaw density. However, the estimation of numbers using this method has required a large investment in time, since a knowledge of the area serviced by the clay sources had also to be ascertained.

Capture-Mark Release

If long-term studies are possible, population densities of parrots might be most accurately made using colour-dyed birds. Conspicuously coloured species that can be easily dyed, such as white cockatoos *Cacatua* spp, may provide good subjects to assess the feasibility and reliability of such a method. Estimates made in this way could be used to test the accuracy of other methodologies, such as VCP's and transects. Radiotelemetry also provides a valuable way of investigating ranging and territoriality, and hence providing a means to fine-tune population estimates, or to test assumptions used in making population estimates. However, it would only be feasible to radiotrack species which were relatively sedentary. Kenward (1987) provides details of radiotelemetry equipment and methodology.

Choosing Methodology

Choosing the most appropriate methodology to fulfil the needs of parrot surveys requires careful consideration. The type of information required, and the amount of time and resources available to conduct surveys, all have an important bearing on the choice. The type of terrain, delectability and order of magnitude of population density must also be taken into account. Hence a thorough pre-survey investigation of parameters which might affect the choice is strongly recommended, as is consultation with relevant members of the ICBP Parrot Group. Nevertheless, guidelines are presented as a means of identifying which methods should be considered under different conditions (Table 9).

Table 9. Guidelines for choosing parrot survey methodology. For each type of attribute, Y indicates that the method may be appropriate, but N indicates that the method is unlikely to be suitable. YY denotes methods which are particularly suited to the attribute under consideration.

	BEHAVIOURAL ATTRIBUTES				HABITAT ATTRIBUTES			LENGTH OF SURVEY	
METHOD[1]	Cryptic	Low Population Density	Wide Ranging or Nomadic	Highly Mobile	Terrain Flat	Terrain Steep	Discrete Habitat Blocks	Long-term	Short-term
Vantage Point Counts	N	Y	?Y	Y	N	Y	YY	YY	Y
Variable Circular Plot	Y	N	Y	N	Y	YY	Y	Y	Y
Transect	N	Y	Y	Y	Y	N	Y'	Y	Y
Aerial Survey*	N	Y	Y	Y	Y	?	Y	Y	YY
Capture-mark-release	YY	Y	N	N?	Y	Y	Y	YY	N

[1] *Counts at congregations is not considered here: this method is only appropriate for species which congregate at roosts or scarce resources.*

** Untested methodology,* ' Assuming blocks are large enough.

Appendix 2. Rationale for Captive Breeding Programmes

Justification

Contrary to the views of many aviculturists, who have claimed that captive breeding is the only survival option for numerous parrot taxa (e.g. Low 1980), conservation of most species in the wild is the most desirable and feasible option.

However, for a small number of parrots, captive breeding as a safeguard against loss of genetic variability, or even extinction, is a pragmatic option. It is important to emphasize that the safety measure of establishing a captive population in no way diminishes the urgency of ensuring the survival of a species in the wild. Nevertheless, carefully coordinated captive breeding can enhance the survival chances of critically endangered populations in the wild, by infusing new genetic material (for example, eggs produced in captivity fostered under wild pairs).

This Action Plan proposes captive breeding programmes for 47 parrot species and subspecies (Tables 8 and 9).

Parrot taxa are sometimes threatened because so many specimens have been (or still are being) trapped for the bird trade. Therefore, suggesting captive breeding projects for these taxa should not be misinterpreted as sanctioning the unsustainable removal of birds from the wild. Rather, because such large captive populations already exist, and because illegal and unsunstainable legal trade continues to threaten the very existence of a number of taxa, it would seem pragmatic to use part of the existing captive population in strictly coordinated and managed captive breeding programmes, as a safeguard against extinction of these taxa in the wild.

Acquisition of founder stock for captive breeding programmes

The founder stock for breeding programmes needs to be selected carefully, since it should preferably comprise of birds of known geographic origin and history. Twenty to 30 founder birds are generally considered sufficient to initiate a captive population capable of preserving 90% of the average heterozygosity of the wild gene pool (CBSG 1992).

Several psittacine taxa, for which captive breeding programmes are recommended in this Action Plan, do not have genetically sufficient founder stock in the world's zoos at present, although for many species there is enough founder stock available in the avicultural community. For most breeding programmes, it will be possible to obtain founder stock without the need to remove additional animals from the wild. Zoos should make every attempt to contact private breeders and develop coordinated programmes with them where practical.

Although this approach is not possible for species with a history of hybridisation or selection for colour mutations in captivity, or where the origin of captive born birds can no longer be traced, many parrot taxa recommended for captive

breeding in this document have captive populations consisting primarily of wild caught individuals and/or first generation captive born offspring.

In the case of taxa available from existing captive stock in private collections, it is recommended that special care be taken to ensure that acquisition of founder stock for *ex situ* conservation does not stimulate unsustainable or illegal trade.

In the case of taxa that need to be obtained from the wild, it is recommended that:

A. The breeding programme is part of an overall conservation strategy for the species.

B. Removal of founder stock is conducted in a way least harmful to the wild population (depending on expert discussion during a recovery workshop) and subject to conditions of non-commerciality and coordinated management as discussed elsewhere in this document.

Species Management Committees

Range countries, as well as importing countries of parrots, are constantly faced with the problem of deciding what to do with confiscated parrots, some of which may be seriously endangered species. In the absence of coordinating bodies, such as a Species Management Committees, animals have sometimes been distributed to less than the optimum captive breeding facilities. More serious, releases of parrots into the wild have taken place without due consideration of disease, subspecies hybridisation and related problems.

It is therefore recommended that Species Management Committees be set up for all taxa for which recommendations for captive breeding have been made. Endorsement should be sought from the relevant regional zoo coordination authority as soon as possible, even if founder stock may not be immediately available, to facilitate distribution of confiscated specimens if and when these become available.

The organisation of captive breeding programmes

The following guidelines should be adhered to:

1. The programme should be set up under the auspices and oversight of one of the regional zoo associations, and/or, in the case of programmes in range countries, of appropriate national authorities.

2. Cooperating persons or institutions should be selected on the basis of past records in husbandry, captive management and breeding of the particular or related taxon, and with due regard to past records of cooperation in managed breeding programmes.

3. Participation in *ex situ* breeding programmes should be dependent on each party's signing an agreement of participation.

4. A management committee should be set up to oversee management of each species or group of species. Members must agree to work for the conservation of the species in the wild as the primary consideration. Personal interests can only be accommodated when they are consistent with the primary consideration of the species' conservation.

5. Wildlife authorities in the range countries should be encouraged to participate in, or closely cooperate with, the management committee, and the committee should play an active role in assisting survival of the species in the wild.

6. A studbook, and ultimately a species plan similar to a United States Fisheries and Wildlife Service Species Recovery Plan, should be developed. Birds within the programme must be closely managed, and all participants should be required to keep adequate records, to follow husbandry recommendations and to adhere to breeding recommendations.

7. As consistent breeding of certain species still poses a problem, the management committees should actively promote research on topics such as nutrition, pairing, fertility, accommodation, behaviour, well-being, disease and rearing. Current captive breeding of many parrot taxa relies heavily upon artificial techniques which still require more research. Increased emphasis should, however, be given to defining the conditions appropriate to stimulate reliable natural parent incubation and rearing.

8. Birds within the programme need to be managed without commercial consideration, and preferably, ownership of the animals should remain with, or returned to the country of origin.

9. Any parrots which the management committee deems to be surplus to the programme should be disposed of in a manner agreed on by the committee.

Appendix 3. Recommendations related to disposition of confiscated parrots

Several thousand parrots are confiscated annually for reasons including violation of wildlife trade restrictions, zoning requirements and animal welfare laws. Disposal of such confiscated birds must be considered in line with conservation priorities.

At present, confiscating authorities favour several options for disposing live birds: return to the wild; placement in zoological institutions; and sale to recoup expenses associated with the confiscation. Several points must be kept in mind when considering whether these or other options are appropriate methods of disposal.

Return of confiscated birds to the wild

Although return of confiscated birds to the wild holds significant emotional appeal, the results are likely to have negligible or even devastating effects on wild populations for all but the most endangered species, and may not be in the best interests of the individual birds involved. Problems related to release of confiscated parrots are summarised below:

1. Birds held in captivity for even a limited time may be exposed to diseases foreign to wild populations, and could serve as vectors for such diseases if returned to the wild, with potentially disastrous effects.

2. Birds held in confinement quickly lose vigour, and if returned to the wild may be much less capable of foraging for food, avoiding predators, etc. The mortality rate of released specimens can therefore be expected to greatly exceed the average for the wild population, neither benefitting the wild population or individual specimens.

3. Unless it is possible to pinpoint the exact location from which parrots were captured, release of confiscated specimens to the wild runs the risk of hybridisation and outbreeding depression.

In view of the above, confiscated specimens should not be returned to the wild unless the following criteria are met:

a) The taxon concerned is threatened, and loss of genetic variability is a concern for the wild populations;

b) Re-patriation would conform to the IUCN Position Statement on Translocation of Living Organisms (IUCN 1987);

c) The exact geographic location from which the animals were removed is known;

d) Rigorous health screening to detect avian diseases is feasible; and

e) A translocation project exists or the funding for it is available from the repatriating organisation.

Placement of birds in zoological and other educational / conservation institutions

On the surface this seems to be the most appropriate option for disposing of confiscated birds that are not to be returned to the wild. However, most of the parrots confiscated are of common, often widespread species of relatively low conservation concern. Placement of large numbers of these birds in zoological or other institutions would tie up scarce resources (space, staff time, and finances) that would be better allocated to the breeding and conservation of more-threatened species. Nor are many zoological or other institutions open to the public generally interested in displaying common species, unless those species possess unusual physical or behavioural characteristics.

Confiscated birds pose disease risks to captive stocks similar to those posed to wild populations. As a result, they must be quarantined for an extended time (as much as one to two years) and be tested and treated for a variety of infectious diseases prior to being mixed with other birds or put on display. Therefore although zoological and institutions should be given the option of acquiring confiscated specimens, they should not be expected to do so unless the species concerned are needed for coordinated captive breeding programmes.

Provision of confiscated parrots to facilities other than zoological institutions (e.g., research facilities, aviculturists participating in coordinated captive breeding programmes) should also be considered. In the case of rarer species, priority should be given to those institutions with a good record of cooperation and proven success in breeding the same or similar species.

Sale of confiscated birds

Offering confiscated specimens for sale (as is currently done in the United States) can be seen as being both beneficial and detrimental to conservation. The sale of confiscated birds could generate funds to be used to offset the costs of enforcing wildlife trade controls or applied toward species conservation programmes.

For species commonly in trade, the sale of confiscated specimens is unlikely to increase demand beyond that which already exists. However, for species not available commercially, placing specimens on the market and in private collections could stimulate additional demand and additional smuggling attempts. Future law enforcement efforts would also be hindered, as the sale of confiscated birds would coincide with an increase in the difficulty of discriminating between 'legalised' and illegal birds.

In some instances, offering confiscated specimens for sale may also reduce the deterrence effect of the initial seizure. There are known cases where birds confiscated upon import due to violation of trade laws were then purchased by the original importer. For those for which import was the primary objective, such a practice serves only to increase the cost of

the bird(s); for those intending to sell the birds, such a practice allows them to complete any intended transactions. Confiscated parrots should therefore not be sold or otherwise allowed to enter commerce unless:

1. The species to be sold is already available in the confiscating country in commercial quantities; and

2. Importers under indictment for or convicted of crimes related to the import are prevented from purchasing the parrots in question.

Government authorities should consider other options for disposing of parrots of species that are neither threatened in the wild nor available in commercial numbers in the confiscating country. Authorities should be prepared to consider euthanasia, which from a species conservation perspective may be preferable to allowing further commerce in protected species.

As confiscating authorities are unlikely to have experience in psittacine conservation, the Parrot Specialist Group, the Captive Breeding Specialist Group and Parrot Taxon Advisory Groups of regional zoo organisations should offer their services to government officials responsible for disposal of confiscated birds. Specifically:

1. The Parrot Specialist Group and the Captive Breeding Specialist Group should cooperate in maintaining a list of those species for which confiscated specimens should be offered to conservation (including captive breeding) programmes. This list should be provided to national governments for distribution to relevant government agencies;

2. Group members should contact authorities in their regions to offer assistance in identifying and deciding on the disposal of confiscated birds; and

3. To the extent possible, Group members should maintain a list of potential locations for the placement of various parrot species.