

# Conserving threatened birds: an overview of the species and the threats with some roles for population studies

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## Introduction

In this paper I present an overview of bird species currently believed to be globally threatened. I describe how threatened bird species are identified and present a summary of major threats that they face. I conclude with a discussion of ways in which population ecologists can assist with the task of conserving the world's endangered birds.

## Overview of globally threatened bird species

About 9000 species of bird inhabit the world, of which 1029 are currently believed to be threatened (ie at risk of global extinction) (COLLAR and ANDREW 1988). Since 1958 there have been four reasonably comprehensive attempts to assess the number of globally threatened species (Table 1). These estimates suggest a steady increase in the proportion of the world's avifauna coming under threat: 1% in 1958 rising to 3% in 1979 with a more rapid increase between 1979 and 1988 to 11%. This increase over the past decade is in part explained by the adoption of a broader definition of threatened by the International Union for the Conservation of Nature and Natural Resources (IUCN 1980) and by the description of new species with highly restricted ranges, but also reflects an increase in the amount of data available and its coverage in the review process. Most importantly however, this increase is a consequence of the speeding up of environmental degradation (COLLAR and ANDREW 1988). IUCN's redefinition accounted for 18 of the 172 threatened

**Table 1** Numbers of threatened bird species identified by four surveys between 1958 and 1988

Year	No. of threatened species	Source
1958	95	GREENWAY 1958
1971	220	VINCENT 1971
1979	290	KING 1978/79
1988	1029	COLLAR and ANDREW 1988

**Table 2** Numbers of bird families including threatened species

% threatened species per family	No. of families
0	48
1-10	48
11-20	25
21-30	14
31-40	9
41-50	3
more than 51	9

species described for Africa by COLLAR and STUART (1985) and the discovery of new species adds a further two. These two explanations together probably therefore account for about 119 (11.5%) of the 1029 threatened species which is only a small proportion of the total increase between 1979 and 1988.

A breakdown of threatened species by family reveals that the danger of extinction is not confined to certain highly specialised or adapted groups of birds. Appendix 1 lists the 156 families of bird found in the world and gives the number of threatened species, per family. Table 2 summarises this information

**Table 3** Bird families where 30% or more of the species are considered to be globally threatened

Kiwis	33
Grebes	30
Fregate Birds	40
Shoebill	100
Flamingos	40
Screamers	33
Megapodes	67
Mesites	100
Plains Wanderer	100
Cranes	47
Finfoots	33
Kagu	100
Barn Owls	50
Potoos	60
Plant Cutters	33
Pittas	31
New Zealand Wrens	33
Scrub Birds	100
Philippine Creepers	50
Hawaiian Honey Creepers	87
Wattle Birds	100

and shows that 69% of families contain at least one threatened species. In 13.5% of the families over 30% of the species are threatened and these families are listed in Table 3.

The proportion of threatened species found on island versus continental nations is shown for KING's (1978-79) survey and that of COLLAR and ANDREW (1988) in Table 4. Although nearly half the world's threatened birds are still found on islands there is a suggestion that the proportion is decreasing, presumably as the rate of habitat destruction on continents increases. Table 5 shows the habitats used by threatened species and reveals a number of interesting differences between the situation in 1979 and 1988. In both surveys three major habitats were found to house over 80% of threatened species with tropical forests being much the most important. However, between 1979 and 1988 the relative importance of tropical forest diminished while both wetlands and grassland/savanna habitats holding an increasing proportion of the world's threatened species; the increase from 7% (20 out of 240) in 1979 to 19% (195 out of 1029) in 1988 for grassland/savanna dwelling species is particularly striking.

**Table 4** Proportions of threatened bird species on islands versus continents

Island	Continental	
53%	47%	KING 1978/79
46%	54%	COLLAR and ANDREW 1988

**Table 5** Proportions of threatened bird species inhabiting different habitats

	KING 1978/79 (290 sp.)	COLLAR and ANDREW 1988 (1029 sp.)
Tropical Forest	64%	43%
Wetland	13%	21%
Grasslands/Savannah	7%	19%
Other/No data	16%	17%

Using the data collated by COLLAR and STUART (1985) for threatened species of Africa and related islands it is possible to gain some insights into their biology. For example, the food eaten by 131 of the 172 threatened species found in Africa is given in Table 6 which shows the predominance of invertebrate feeders. This may simply reflect the relative abundance of insectivores amongst the whole avifauna or may genuinely indicate that birds dependent on invertebrates are more likely to be threatened.

**Table 6** Foods of threatened bird species in Africa (data from COLLAR and STUART 1985)

Foods	No. of threatened species	%
Invertebrate	60	35
No Data	41	24
Fruit/Seed/Shoots	30	17
Omnivors	19	11
Fish	8	5
Birds/Mammals/Reptiles	5	3
Nectar	6	3
Molluscs	2	1
Carrion	1	1

### Conserving threatened species

Ideally when attempting to conserve those species most at risk of global extinction the procedures outlined in the following lines. In practice many steps are often missed in the struggle to manage and protect a particular species or indeed habitat.

#### *Assessing which species are threatened*

For those concerned with conserving species at risk of global extinction one of the first tasks is to identify which species are threatened. Ideally such an assessment requires data on range and population size and most importantly whether and how these have changed. Such data are rarely available for well studied temperate species and almost never exist for species which, simply because they are scarce, are difficult to find and study.

To focus attention on species believed to be threatened IUCN and ICBP developed the concept of "Red Data Books" (eg. COLLAR and STUART 1985). These compilations draw together published and unpublished information on distribution, population size, ecology, threats and conservation measures taken. On the basis of this synthesis further conservation measures are proposed.

Each species is assigned to a category of threats depending on how highly at risk it is thought to be. The categories used in the current edition of the bird red data book (COLLAR and STUART 1985) are given in Table 7. The placement of a species in one of the two most threatened categories requires a knowledge, or at least an assessment, of the caused factors operating on the species leading to its demise. It is assumed that the numbers are declining (or that the range is contracting) and that this will lead to extinction unless the caused factors cease. Species categorised as Rare (ie with small world populations) are not believed to be declining to the extent that they should be considered Endangered or Vulnerable. Two other categories, Indeterminate and Insufficiently Known, do

**Table 7** Definitions of categories of threat

Category	Definition
Extinct	Species not definitely located in the wild during past 50 years
Endangered	Species in danger of extinction and whose survival is unlikely if the <i>causal</i> factors continue operatin
Vulnerable	Species believed likely to move into the Endagered Category in the near future if the <i>causal</i> factors continue operating
Rare	Species with small world populations that are not yet Endangered or Vulnerable but are at risk
Indeterminate	Species known to be Endangered, Vulnerable or Rare but <i>not enough information</i> exists to say which of the three categories is appropriate
Insufficiently Known	Species that are suspected but not definitely known to belong to any of the above categories, because of <i>lack of information</i>
Out of Danger	Species formerly in one of the above categories but which are now considered relatively secure because effective conservation measures taken or previous threat removed

not call for data on the causes of species' decline but reflect, perhaps more realistically, the lack of information.

Table 8 shows for threatened species in Africa, the number in each category in 1979 (KING 1978-79) and 1985 (COLLAR and STUART 1985). In seven years a further nine species moved into the Endangered category and 49 were included in the Rare category. As for the total number of threatened species, this reflects both an increase in the quality of data and research time as well as increasing environmental degradation. For the seven endangered species, it is the latter that has brought them closer to extinction.

**Table 8** Number of threatened species in each category of threat for Africa in 1978 and 1985

Category	KING (1979)		COLLAR and STUART (1985)	
	No. of species	%	No. of species	%
Extinct	0	0	2	1
Endangered	19	29	28	16
Vulnerable	13	20	15	9
Rare	29	45	78	45.5
Indeterminate	4	6	31	18
Insufficiently Known	-	-	18	10.5

### The Threats

The reasons why a species is threatened with extinction are many and varied. In some cases the range may be being reduced, by for example habitat destruction, in others population density may be declining due to increased mortality through over exploitation.

The primary threats identified by COLLAR and STUART (1985) for the threatened species of Africa and related islands are summarised in Table 9. Habitat destruction, especially of forests, is clearly the largest single threat to species survival in the region but introduced predators and competitors and direct human utilization (hunting, collection, etc.) and persecution are also major threats. Predation by exotic species is particularly prevalent on islands (JOHNSON 1989). Where restricted range is given as a threat it is known that this has no come about directly as a result of the threats listed above it in Table 9 (ie the cause of restriction is unknown) and together with the 37 'data species', to highlight the level of ignorance surrounding threatened species conservation.

**Table 9** Major threats to threatened bird species in Africa (data from COLLAR and STUART 1985)

	Number of species	%
Habitat destruction		
- Forest	70	41
- Wetland	6	3
- Grassland	3	2
Introduced predators/Comp.	26	15
Over exploitation	15	9
Persecution/Human disturbance	7	4
Bird Trade/Zoo Collections	3	2
Exotic Fish	2	1
Hybridisation	1	1
Matural (drought)	1	1
Restricted Range	22	13
No Data	37	22

### Conservation action required

In order to prevent the ultimate extinction of a species it is obviously necessary to remove the threat or threats. In some cases simply stopping the cause of threat may no longer be enough, and some restoration may also be required. The actions possible divide into two types: interventionist and non-interventionist. The latter do not in themselves require any direct interaction with the birds or their habitat; examples include legislation, habitat preservation through the development of a protected area network and conservation education (attempting to change public attitudes towards wildlife).

Interventionist conservation actions either involve restoration of the habitat or restoration of the bird populations themselves. They may be short term solutions that simply serve to prevent imminent extinction; for example the provision of supplementary food or perhaps in the most extreme case captive breeding for reintroduction. Long term solutions require the removal of the ultimate threat and include such actions as habitat restoration (eg. reforestation) or total eradication of exotic predators.

### **Conserving threatened species: roles for population biologists**

In the brief overview above I have described the diversity of bird species currently under threat and some of their characteristics, outlined the threats and discussed possible conservation actions. In this final section I suggest where population biologists may be most helpful in conserving threatened species.

In order to accurately assess whether or not a species is in danger of extinction and, if so, to determine how threatened it is, requires data on distribution and numbers and changes in both over time. There is a need to develop a set of simple repeatable survey techniques that can be applied to as many candidate species as possible. Even a single reliable figure for population size would be beneficial in determining which species may be in most need of further attention. While a great many ornithologists are willing to carry out such surveys, there is a real need to ensure data is obtained in comparable ways.

Where species are known to be threatened successful conservation action is most likely if the threat can be identified. Often while the preservation of large tracts of forest or wetlands may ensure a species survival, this is no longer feasible given the human pressures and needs for the same natural resources. To save birds under these circumstances their ecological requirements must be determined so that the essential elements of the habitat can be retained (or artificially provided) while human exploitation occurs too. However, a review of the population ecology of well studied unthreatened species quickly reveals that such an approach will rarely help in the struggle to prevent extinction (give eg's). An alternative, and more productive, role for the population biologists, may be to monitor experimentally the impact of conservation actions that are undertaken to save species. For example, when exotic predators are removed from an island (as happened on Fregate Island in Seychelles where cats were believed to be threatening the Seychelles Magpie Robin, WATSON et al. 1989), monitoring the species' response (ie changes in nesting success, adult mortality and overall population size) would enable us to evaluate the success of the conservation action. In the case of the Magpie Robin the cats were eradicated but the population size remained the same. Since neither nesting success nor adult mortality were measured before and after the eradication of cats, it is not possible to assess the value of the conservation action other than by intuition. Regrettably this is the norm with conservation management. If population biologists had monitored a fraction of the conservation actions that have been

attempted, we might now be in a position to predict the outcome of similar actions for other threatened species. Such rigour in conservation can provide insights into biological theory as well as aiding conservation practice. This is exemplified by a recent translocation of a threatened single island endemic bird the Seychelles Brush Warbler *Acrocephalus seychellensis* (ICBP 1988, RANDE 1989). This species was once reduced to about 30 individuals on the 27 ha island of Cousin. Management by the International Council for Bird Preservation brought the population back up to over 300 individuals many of whom were unable to establish breeding territories of their own but became helpers during their parents future breeding attempts. In order to further decrease the risk of extinction for the Seychelles Brush Warbler, a translocation of 29 birds was carried out to Aride Island following a year of parallel monitoring of insect abundance and vegetation cover on both islands to ensure that the warbler could potentially survive on Aride. By monitoring both populations after the transfer data was obtained not only on the success of the conservation action (KOMDEUR, BULLOCK and RANDE in press) but also on the behaviour of helpers once their partners have been removed. Within hours such helpers assumed the role of full territory holders and began breeding themselves suggesting not only that there really were no available breeding territories on Cousin before the space was created but also that being a helper improved the chances of taking over the territory once it became available.

The demography of wild populations is only really well understood for species that are common and have been studied for long periods during which there have been quite long fluctuations in their environment (usually food supply). Since threatened species *de facto* are not common and usually experience nothing but worsening environmental conditions (hence their scarcity) they are not attractive animals for study by population biologists. However, as was shown in Appendix 1 a high proportion (69%) of bird families now contain at least one threatened species and it may be possible, based on data obtained from common members of the family, to construct demographic models for some kinds of threatened species. CROXALL demonstrated the value of this approach for seabirds. Such models may be useful in identifying which population parameter is different to that of a healthy population or species and thus indicate where the threat may be. Using such models it may also be possible to determine how much a particular conservation action will enable the population to survive. For example, how big does a protected area of forest need to be to maintain a demographically healthy population? Can such a forest be utilised in any way by man and still retain a viable population of threatened species? Can a level predation by introduced species be tolerated?

Anschrift des Verfassers:

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## Appendix I

The number of species, and number of threatened species per bird family and the percentage of each bird family threatened

Families		No. of species in world	No. of threatened species	%
Struthionidae	Ostriches	1	-	-
Rheidae	Rheas	2	-	-
Casuariidae	Caowaries	3	-	-
Dromaiidae	Emus	1	-	-
Apterygidae	Kiwis	3	1	33
Tinamidae	Tinamous	46	8	17
Spheniscidae	Penguins	18	3	16
Gaviidae	Divers	5	-	-
Podicipedidae	Grebes	20	6	30
Diomedidae	Albatrosses	13	2	13
Procellariidae	Petrels, Shearwaters	66	19	29
Hydrobatidae	Storm Petrels	20	4	20
Pelecanoididae	Diving Petrels	14	1	25
Phaethontidae	Tropic Birds	3	-	-
Pelecanidae	Pelicanes	8	2	25
Sulidae	Gannets, Boobies	9	1	11
Phalacrocoracidae	Cormorants	32	3	9
Anhingidae	Anhingas	4	-	-
Fregatidae	Frigate birds	5	2	40
Ardeidae	Herons, Bitterns	61	7	11
Balaenicipitidae	Whale Headed Stork	1	1	100
Scopidae	Hammerkop	1	-	-
Ciconiidae	Storks	17	5	20
Threskiornithidae	Ibises, Spoonbills	33	7	21
Phaenicopteridae	Flamingos	5	2	40
Anhimidae	Screamers	3	1	33
Anatidae	Ducks, Geese, Swans	144	20	3
Cathartidae	New World Vultures	7	1	14
Pandionidae	Ospreys	1	-	-
Accipitridae	Hawks, Eagles	219	37	17
Sagittariidae	Secretary Bird	1	-	-
Falconidae	Falcons, Caracaras	59	6	10
Megapodidae	Megapodes	12	8	67
Cracidae	Curassows, Guans	43	16	37
Phasianidae	Pheasants, Grouse	201	42	8
Opisthocomidae	Hoatzins	1	-	-
Mesitornithidae	Mesite	3	3	100
Turnicidae	Button Quails	14	4	29
Pedionomidae	Plais Wanderer	1	1	100
Gruidae	Cranes	15	7	47
Aramidae	Limpkin	1	-	-
Psophiidae	Trumpeters	3	-	-

Appendix I (Continued)

Families		No. of species in world	No. of threatened species	%
Rallidae	Rails, Coots	122	29	7
Heliornithidae	Sungrebes (Finfoots)	3	1	33
Rhynochetidae	Kagu	1	1	100
Eurypgidae	Sunbitterns	1		-
Cariamidae	Seriemas	2		-
Otididae	Bustards	24	6	25
Jacanidae	Jacanas	8		-
Rostratulidae	Painted Snipe	2		-
Dromadidae	Crab-Plover	1		-
Haematopodidae	Oystercatchers	7	2	29
Ibidorhynchidae	Ibis-bill	1		-
Recurvirostridae	Avocets, Stilts	13	1	8
Burhinidae	Stone Curlews	9		-
Glareolidae	Couriers, Pratincoles	16	1	6
Charadriidae	Plovers	64	7	11
Scolopacidae	Sandpipers, Snipe	185	11	6
Thinocoridae	Seed Snipe	4		-
Chionidae	Sheathbills	2		-
Stercorariidae	Skuas	5		-
Laridae	Gulls, Terns	89	9	10
Rynchopidae	Skimmers	3		-
Alcidae	Auks	22	1	5
Pteroclididae	Sandgrouse	16		-
Columbidae	Doves, Pigeons	259	50	19
Loriidae	Loris	55	10	18
Cacatuidae	Cockatoos	18	5	28
Psittacidae	Parrots	260	56	22
Musophagidae	Turacos	18	2	11
Cuculidae	Cuckoos	128	10	8
Tytonidae	Barn Owls	12	6	50
Strigidae	Owls	134	15	11
Steatornithidae	Oilbird	1		-
Podargidae	Frogmouths	13	1	18
Nyctibiidae	Potoos	5	3	60
Aegothelidae	Owlet-Nightjars	8		-
Caprimulgidae	Nightjars	75	8	11
Apodidae	Swifts	80	8	10
Hemiprocniidae	Tree Swifts	4		-
Trochilidae	Humming Birds	238	30	13
Coliidae	Mousebirds	6		-
Trogonidae	Trogon	37	3	8
Alcedinidae	Kingfishers	91	8	22
Todidae	Todis	5		-
Momotidae	Motmots	9	1	1
Meropidae	Bee Eaters	24		-

Appendix I (Continued)

Families		No. of species in world	No. of threatened species	%
Coraciidae	Rollers	11	34	25
Brachypteraciidae	Ground Rollers	5		
Leptosomatidae	Courels	1		—
Upupidae	Hoopoes	1		—
Phoeniculidae	Wood Hoopoes	8		—
Bucerotidae	Hornbills	46	7	15
Galbulidae	Jacamars	17	1	16
Bucconidae	Puffbirds	32		—
Capitonidae	Barbets	81	4	5
Indicatoridae	Honeyguides	14	1	7
Ramphastidae	Toucans	34	1	3
Picidae	Woodpeckers	204	7	6
Eurylaimidae	Broadbills	15	1	7
Dendrocolaptidae	Woodcreepers	52	1	2
Furnariidae	Ovenbirds	219	19	9
Formicariidae	Antbirds	230	31	13
Conopophagidae	Gnateaters	8	1	12
Rhinocryptidae	Tapaculos	30	2	7
Contingidae	Cotingas	80	14	17
Pipridae	Manakins	55	2	4
Tyrannidae	Tyrant Flycatchers	373	16	4
Oxyruncidae	Sharpbill	1		—
Phytotomidae	Plantcutters	3	1	33
Pittidae	Pittas	26	81	
Xenicidae	New Zealand Wrens	3	1	33
Philepittidae	Asities	4	1	25
Menuridae	Lyrebirds	2		—
Atrichornithidae	Scrub Birds	2	2	100
Alaudidae	Larks	80	7	9
Hurundinidae	Swallos, Martins	7	4	5
Motacillidae	Wagtails, Pipits	52	4	8
Campephagidae	Cuckoo Shrikes	72	7	10
Pycnonotidae	Bulbus	120	9	7
Irenidae	Leafbirds, Ioras	14		—
Laniidae	Shrikes	79	6	6
Vangidae	Vanga Shrikes	13	2	15
Bombycillidae	Waxwings	8		—
Dulidae	Palm Chat	1		—
Cinclidae	Dippers	5	1	20
Troglodytidae	Wrens	59	6	10
Mimidae	Mocking Birds, Trashers	30	2	7
Prunellidae	Accentors	12		—
Muscicapidae	Thrushes, Warblers, etc.	1510	48	10
Aegithalidae	Longtailed Tits	8		—
Remizidae	Penduline Tits	10		—
Paridae	Tits, Chickadess	48	2	4

Appendix I (Continued)

Families		No. of species in world	No. of threatened species	%
Sittidae	Nuthatches	25	6	24
Certhiidae	Tree Creepers	6		—
Rhabdornithidae	Philippine Creepers	2	1	50
Climacteridae	Australian Creepers	7		—
Dicaeidae	Flowerpeckers	58	2	3
Nectariniidae	Sunbirds	117	8	7
Zosteropidae	White Eyes	84	19	23
Meliphagidae	Honeyeaters	169	12	7
Emberizidae	Bunting, Tanagers	576	49	9
Parulidae	New World Warblers	123	14	11
Drepanididae	Hawaiian Honeycreepers	16	14	87
Vireonidae	Vireos	44	1	2
Icteridae	New World Blackbirds	90	11	12
Fringillidae	Finches	121	8	7
Estrildidae	Waxbills	129	6	5
Ploceidae	Weavers, Sparrows	157	16	10
Sturnidae	Starlings	107	7	7
Oriolidae	Orioles	28	2	7
Dicruridae	Drongos	20	2	10
Callaeidae	Wattlebirds	2	2	100
Grallinidae	Maggie Larks	4		—
Artamidae	Wood Swallows	10		—
Cracticidae	Butcher Birds	10		—
Ptilonorynchidae	Bower Birds	18	2	11
Paradisaeidae	Birds of Paradise	43	5	11
Corvidae	Crows, Jays	113	13	12

# ZOBODAT - [www.zobodat.at](http://www.zobodat.at)

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Berichte der Deutschen Sektion des Internationalen Rates für Vogelschutz \(fortgesetzt als Berichte zum Vogelschutz\)](#)

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