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# *Accessing Silence*

Research Methods into Sexual Harassment:  
A Case Study of the Committee of Enquiry  
into Sexual Harassment at the  
University of Cape Town.

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Master of Philosophy Degree  
University of Cape Town**

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The Causes of Avian Extinction and Rarity

by

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Thesis submitted in the Faculty of Science (Department of Ornithology), University of Cape Town for the degree of Master of Science.

June 1997

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Declaration:

I certify that this thesis results from my original investigation, except where acknowledged, and has not been submitted for a degree at any other university.

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*Then God said, "Let us make man in our image, in our likeness, and let them rule over the fish of the sea and the birds of the air, over all the livestock, over all the wild animals, and over all the creatures that move on the ground."*

Genesis 1: 26 (New International Version of the Bible)

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## Abstract

Biological extinction rates have escalated by as much as 1000 times the background extinction rate over the last 1500 years, causing concern over the long-term survival of many species. Avian extinctions since 1600 have been well documented relative to other taxa, as have current levels of avian threat. This study analyses avian extinctions post-1600 and current threats in an attempt to develop some predictive capacity about which avian taxa should be awarded the highest conservation priority.

Analyses performed include examinations of the causes of avian extinction and threat, geographical location of extinct and threatened species, prehistoric and historical extinction rates, endemism, migration, bird body size and phylogenetic diversity. An analysis dealing with historical and phylogenetic aspects of endangered and critically threatened species was performed, from which the world's most threatened species were identified. Factors which were the primary cause of historical extinctions are generally not the primary factors threatening today's extant avifauna. Whilst introduced predators and exploitation were primary causes of historical extinctions, habitat destruction poses the greatest threat to extant birds. Species predisposed to extinction typically have restricted ranges, and, compounded by habitat loss, these ranges are becoming more restricted. This has resulted in mainland-dwelling species becoming as prone to extinction as island-dwelling species have been historically. Introduced predators, however, do still threaten many of the world's most threatened species and their potential effects are highlighted in the phylogenetic analysis.

Already, many extinctions may be inevitable over the next 25 years as a result of habitat loss. The magnitude of extinctions across all animal and plant species in the next few decades could be comparable with that of previous mass extinctions unless immediate conservation action is taken. However, future conservation efforts will have to be prioritized, and this study is intended as a contribution towards such a prioritization exercise.

## Chapter One: Introduction and methods.

### Part 1 - Introduction

It is estimated that the  $1.4 - 1.8 \times 10^6$  species of living organisms described to date may represent less than 15% of the world's biodiversity (Raven and Wilson 1992). This figure does not take into account the vast number of micro-organisms that are still to be described. The lack of knowledge of biodiversity is especially marked in the tropics, where most species occur and where the rates of extinction and form creation (*sensu* Balon 1993) appear to be the highest.

While there may be as many as  $40 \times 10^6$  extant species of plants and animals, between  $5 - 50 \times 10^9$  species are likely to have existed in the past, representing a 99.9% extinction rate (Raup 1992). Extinction is thus a natural and vital component of evolution. Diamond (1984a) breaks extinction into two extremes:

1. Dramatic and sudden extinction due to some clearly identifiable event, impinging on many species as a wave of extinctions.
2. "Normal" extinctions that affect populations isolated on islands or disjunct patches of habitat. This eliminates populations one by one rather than as a wave of extinctions.

Extinction can be either phyletic or terminal (Ehrlich and Ehrlich 1981, Soulé 1983). Phyletic extinction occurs when, through the process of evolution and adaptive radiation, a parental species is replaced by one or more derivative species. Terminal extinction occurs when there is no derivative species following the extinction of a unique species. These species become extinct either because they do not evolve rapidly enough to meet changing circumstances or because niches disappear and no capacity for rapid evolution could save them (Smith 1989).

Ehrlich *et al.* (1977) estimated the average species' lifespan of vertebrates at between

200 000 and 2 000 000 years, giving a background extinction rate of 0.2 to 2 species per million species per year. This rate has apparently increased by 1000 to 10 000 fold due to anthropogenic impacts (Wilson and Peter 1988), although some authors dispute this: (Budiansky 1994, Simon 1995, Simon and Wildavsky 1993). Various estimates of global extinction rates project annual losses of between 1000 and 30 000 species by the end of this century (Reid and Miller 1989, Ehrlich and Wilson 1991, Wilson 1992).

### The next mass extinction?

There have been at least five mass extinctions in the past 440 million years: at the close of the Ordovician (438 mya), Devonian (360 mya), Permian (248 mya), Triassic (213 mya) and Cretaceous (65 mya) periods, when the number of families of some marine organisms declined by 12, 14, 52, 12 and 11% respectively (Wilson 1989). Wilson (*op. cit.*) states that although 90% of past species extinctions occurred at times other than these five, mass extinctions have a profound biological significance through their impact on selection regimes. Simberloff (1984, 1986a) questions if we are not at the beginning of the next mass extinction, the causes of this mass extinction being anthropogenic. Diamond (1989) and Pimm (1995) not only suggest that this is occurring, but also that it has been under way for thousands of years.

Wilson (1989) estimated that as many as 4 000 to 6 000 species per year may be being lost from tropical rain forests alone and that man-induced extinction rates may reduce current biodiversity to its lowest level since the end of the Mesozoic era, 65 million years ago. These rates of extinction are far higher than those suggested in the IUCN Red List (Groombridge 1993). Over the last decade, upwards of 20 000 species have been listed as being at risk by one or more prominent conservation organisations (McNeely *et al.* 1990, WRI 1990, Smith *et al.* 1993a).

Smith *et al.* (1993a,b) calculated that about 486 animal species have become extinct since 1600 AD. In the latest IUCN Red list of Threatened Animals (Groombridge 1993), 615 species are reported to have become extinct since 1600. This figure includes 83 mammals, 114 birds, 20 reptiles, four amphibians, 36 fishes and 358 invertebrates. Humphries and

Fisher (1994) have suggested that there was a sharp increase in the rate of animal extinctions between 1850 and 1950, which coincided with the rise of European colonial expansion and the use of natural resources to fuel the industrial revolution (Smith *et al.* 1993b); a direct correlation exists between the total amount of energy consumed by mankind and animal extinction rates (Ehrlich 1994). Ehrlich (*op.cit*) further contends that total energy consumption could be used as an index of global extinction rates, and predicts that these rates could be far higher than present estimates suggest: 30 years to the extinction of 50% of all species of mammals and birds.

Other estimates of the rate of biotic extinction over the next 50-100 years range from 15-20% of present biodiversity (Mace 1994) to 25% (Nicholson 1991) and 50% (Smith *et al.* 1993b). These rates approach that required to generate a genus-level extinction at a scale equivalent to and perhaps surpassing some of the largest mass extinctions in history (Ehrlich 1986). Although today's extinction patterns conform mainly to greatly intensified versions of background extinction rates, losses are concentrated in narrowly endemic species and subspecies (Jablonski 1994), which inhabit primarily tropical regions (Simberloff 1986a).

The loss of species is not the only consequence of extinctions. Theoretical and empirical data now exist which show that ecosystems in the tropics not only contain more species but also a richer network of interactions between species, and that they are more dynamically fragile than higher-latitude systems (reviewed by May 1981; Bruton 1989, 1990). These systems are characterised by high biotic saturation and strong interspecific interactions such as symbioses, commensalism, parasitism, hyperparasitism and communal broodcare (Ribbink *et al.* 1983, Ribbink 1994). Naeem *et al.* (1994) demonstrated that (under controlled, experimental conditions) the loss of biodiversity could alter or impair the services that ecosystems provided (Ehrlich and Wilson 1991). The stable productivity of ecosystems is dependent upon the preservation of biodiversity in these systems (Tilman and Downing 1994). An extinction of one species in a complex system could lead to an "extinction cascade" which in turn could threaten much of the biodiversity within the system (Diamond 1989, Williamson 1989).

Extinctions therefore result in the loss of both species and life-supporting interactions between species, with a resultant cascading effect on taxa that were not originally impacted. The mature successional state of tropical systems, which typically includes a high proportion of specialised, precocial species, tends to be reversed by man's perturbations, with the result that more generalised, altricial species survive (Bruton 1989). Furthermore, the precocial species that have been lost will not be replaced by other specialist species because their respective specialisations are too great to allow interchangeability (Hsu 1982). Instead, the niches of extirpated species may be adopted by altricial species that are generalists, and the complex interactions between specialist species may disappear.

### Birds and extinction

A primary aim of conservation is to reduce the rate at which the world's biological diversity is being lost. *Inter alia* this requires developing predictions about which taxa are most at risk and why. Various approaches have been used, including measures of genetic variability and Minimum Viable Population analysis. An alternative approach is to analyse the reasons why species have become extinct or are facing imminent extinction.

Avian extinctions since 1600 are well documented by comparison with other taxonomic groups (Jenkins 1992) and the threats posed to extant species are well catalogued in the Red Data Books (e.g. Collar and Andrews 1988, Collar *et al.* 1994). Thus, birds lend themselves well to this type of analysis.

This thesis examines avian extinctions since 1600 and the types of threat currently faced by bird species. Specifically, the study addresses the following questions:

1. Which bird species have become extinct since 1600?
2. What were the causes of these extinctions, and did these change over time? What are the current causes of threat to avifauna?
3. How has the rate of species extinction changed over time?
4. Where did species become extinct and are there extinction "hotspots"? How do these compare with threat "hotspots"?

5. What factors or combination of factors predispose birds to extinction; e.g. range size and endemism, body size, flight capabilities, specific threats or combinations thereof?
6. How do the attributes of species currently threatened with extinction compare to those that have already become extinct?
7. Based on the above, which avian species are potentially at greatest risk of global extinction?

### Thesis structure

The thesis is divided into four chapters:

Chapter 1: The introduction and methods. Included here are a literature review, data collection procedure, and data analysis techniques.

Chapter 2: Avifaunal extinctions. The chapter is divided into a results section and a discussion section. The chronology, causes, geography and taxonomy of extinct birds are dealt with as well as migration, endemism and body size. The discussion section considers in addition these, prehistoric extinctions.

Chapter 3: Current threats to avifauna. The chapter is divided into a results and discussion section which consider cause, geography, taxonomy, endemism, body size and habitat of currently threatened species.

Chapter 4: This chapter draws together prehistoric and historical extinction, and current threat in terms of cause, geography and taxonomy in order to attempt to answer question seven above. A phylogenetic analysis is presented as one means of prioritising threatened species within threat categories.

## Part 2 - Methods

### Extinction literature

The primary sources of extinction information were six books and a list supplied via the Internet by the Worldwide Fund for Nature (Table 1).

Table 1. Sources used in gathering extinction data.

<i>Author (s)</i>	<i>Date</i>	<i>Title</i>	<i>Number of extinct species listed</i>
1. Clements, F. J.	1991	Birds of the World: A Check List	60
2. Collar, N.J., Crosby, M.J. and Stattersfield, A.J.	1994	Birds to Watch 2. A Checklist of Threatened Birds	14
3. Day, D.	1989	The Encyclopaedia of Vanished Species	92
4. Fuller, E.	1987	Extinct Birds	86
5. Greenway, J.C.	1967	Extinct and Vanishing Birds of the World	51
6. Mountfort, G.	1988	Rare Birds of the World	75
7. W.W.F.	1994	No Title	97

Although Fuller (1987) and Day (1989) are semi-popular publications, these were used in compiling the database of extinct species because they detailed causes of extinction more often than other sources and also listed species not listed in other sources. Fuller (1987) is reviewed by Brooke (1988).

Comparison of data from these sources revealed the following:

1. The number of sources listing any one extinction varies greatly; 32 extinctions were listed by only one of the sources. Only two extinctions were listed by all seven sources. However, Collar *et al.* (1994) listed only 14 of the most recent extinctions and, excluding this publication, 24 species are listed by all six sources.
2. Each source, except Greenway (1967) and Collar *et al.* (1994), list species that are unique to it (Table 2). These species form 23% of the dataset.

3. There was much discrepancy in allocating species and subspecies amongst the sources; this problem is discussed below. (Zink and McKittrick (1995) highlight current concepts of species and the implications of these to ornithology).

Table 2. The number of extinct avifauna unique to respective authors.

<i>Author</i>	<i>Non-passerines</i>	<i>Passerines</i>	<i>Total</i>
1. Clements (1991)	1	3	4
2. Day (1989)	16	1	17
3. Fuller (1988)	0	1	1
4. Mountfort (1967)	2	1	3
5. W.W.F. (1994)	5	2	7
Total	24	8	32

### Threat literature

Collar *et al.* (1994) list 1111 avian species that are considered globally threatened. These are divided into four categories: extinct in the wild, critically endangered, endangered and vulnerable: there are 4, 168, 235 and 704 species in each respective category. According to the new IUCN criteria (Collar *et al.* 1994), critically endangered species stand a 50% chance of extinction in five years, endangered species a 20% chance of extinction in 20 years and vulnerable species a 10% chance of extinction in 100 years. It is thus more difficult to allocate a species to endangered or critical status as compared with vulnerable (Fig. 1).

A species listed as extinct in the wild is known to survive only in captivity or as a naturalised population (or populations) well outside the historical range. The four species falling in this category are the Alagoas Curassow *Mitu mitu*, the Guam Rail *Gallirallus owstoni*, the Socorro Dove *Zenaida graysoni* and the Kakapo *Strigops habroptilus*. I have grouped "extinct in the wild" and "critical" together to make analysis easier, thus listing 172 species as critically threatened. Alison Stattersfield (BirdLife International) supplied a dataset that was used in the threat analyses.

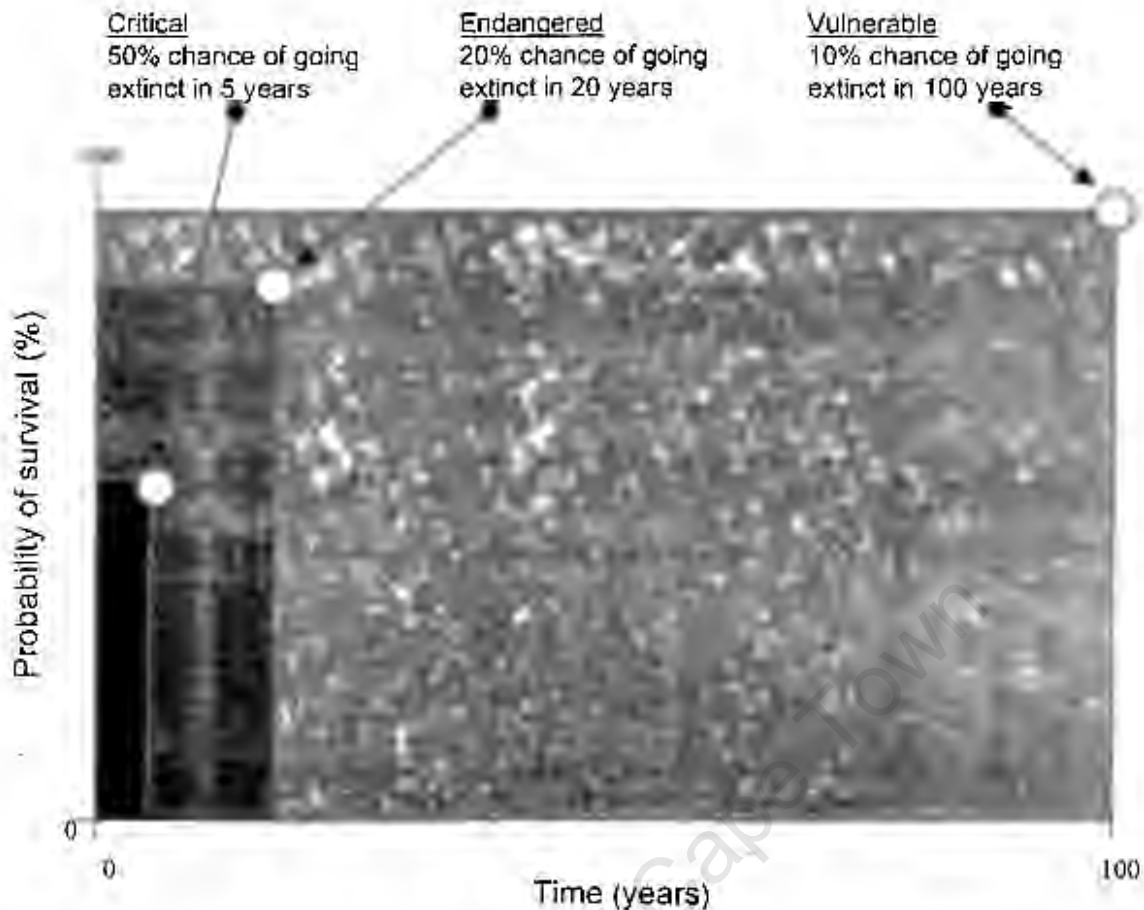


Fig. 1. Extinction probabilities and the IUCN threat categories. This representation indicates the relative difficulty (represented by the relatively small, dark rectangles enclosed by the threshold lines) of qualifying as endangered and, especially, critical, compared with vulnerable (light, pale rectangle). (From Collar *et al.* 1994).

## Data analysis

### i. Extinction data

Data for extinct species were extracted from the seven sources and compiled into one dataset. The compilation of this dataset took into account repetition of species by different authors and synonyms in nomenclature. There were difficulties encountered in allocating taxa to species as distinct from subspecies.

### *Distinguishing between species and subspecies*

Initially the database contained 214 species and subspecies that the various sources listed as extinct. Three authors list subspecies: Day (1989) - 53, Greenway (1967) - 44 and Fuller (1987) - 41. Fuller also lists 29 races, resulting in his listing 70 taxa below the species level. Often, what one author called a species, another called a subspecies or race. For instance, Fuller (1987) considered the New Zealand Little Bittern *Ixobrychus minutus novaezelandiae* distinct only at the subspecies level whereas Mountfort (1988) and WWF. accorded it specific status *Ixobrychus novaezelandiae*; Greenway (1967) treated the New Zealand Quail as a subspecies *Coturnix novaezelandiae novaezelandiae* whereas Day (1989), Mountfort (1988), Fuller (1987) and the WWF. treated it specifically as *Coturnix novaezelandiae*. In these and other such cases, the following criteria were applied to determine if a taxon was included in the species list:

1. If there was a trinomial scientific name it was treated as a subspecies and not included.
2. If one source named a bird a subspecies and more than one source called the same bird a species, the classification supported by the most sources was used.
3. In the case where an equal number of sources were in disagreement, the most recent reference was used.

All scientific names are found in the appendices if not mentioned in the text.

### *Data compilation*

All extinction data were compiled into two datasets. These datasets held information as follows:

- A dataset with information on species extinctions (Appendix 1).
- A dataset with information on subspecies extinctions (Appendix 2).

These datasets hold information on species/subspecies classification and nomenclature, bird body mass, extinction location, most recognised extinction date, extinction causes and a reference section. Sub-specific data are presented for completeness but are not included in analyses nor are body masses given for these.

### *Chronology of extinction*

The time period from 1600 to present was divided into eight 50-year time intervals; 1600-1649, 1650-1699 etc. The year of each extinction was placed into the appropriate 50-year interval together with information concerning the causes of extinction. This enabled an analysis of the rate of extinction with time and an examination of the most important causes of extinction during a specific time period. Patterns of change in causes of extinction over time were derived from this database. Data were analysed for (1) species occurring on both islands and the mainland regions, (2) island species only and (3) mainland species only.

### *Causes of extinction*

Temple (1978, 1986) and Simberloff (1986b) make a distinction between two types of cause of extinction, the “proximate” cause of extinction and the “ultimate” cause of extinction. Proximate causes are those which caused the death of the last remaining individuals of the species. This contrasts with the ultimate cause of extinction, which refers to events that may have occurred earlier, and led to a situation in which there would be a small, terminal population committed to extinction. In this analysis both proximate and ultimate causes are considered.

Diamond (1984b, 1989) classified known causes of extinction into four categories which he termed “the evil quartet”. These were:

1. Overkill;
2. Habitat destruction and fragmentation;
3. Impact of introduced species; and
4. Chains of extinction or “extinction cascades”.

I have used the first three of Diamond’s categories and adapted their nomenclature in order to use them in conjunction with the threat causes listed in Collar *et al.* (1994). As a result I identified five general causes of recent avian extinctions. These were:

1. Exploitation (Ex.): Includes the hunting of birds and eggs for food; taking of birds, feathers, and eggs for trade or collection; persecution for various reasons.
2. Habitat destruction (H.D.): Includes fire, destruction of indigenous forest for logging/slash-and-burn agriculture, removal of forests for large scale crop and livestock farming, destruction of forest to make way for urban development.
3. Introduced predators (I.P.): Includes cats, rats, dogs, and a snake species. Man introduced these either accidentally or deliberately.
4. Other (O): Seven species fell into this category, the causes being:
  - a. competition with man for marine invertebrates;
  - b. disease introduced by alien birds; and
  - c. competition with introduced alien birds for a common resource.
5. Unknown (?): The definite reasons for many extinctions are unknown, especially those occurring from 1600-1750. In here may be included the fourth of Diamond's "evil quartet".

Frequently, a combination of the above factors has caused extinctions, e.g. in the case of the Passenger Pigeon *Ectopistes migratorius* it was the combined effects of the loss of its natural habitat and severe hunting that brought this species to extinction (Bucher 1992). These were perhaps ultimate and proximate causes respectively. When there was a combination of causes it was listed as e.g. (HD/Ex.), (HD/IP) or (Ex/IP).

### *Geography of extinction*

To investigate the geography of extinctions, islands and mainland (continental) regions were compared to determine which have experienced the most extinctions. An oceanic perspective of island extinctions was obtained by dividing the oceans of the world into the northern and southern Pacific, northern and southern Atlantic and the southern Indian Ocean (north and south being divided at the Equator). The positions and sizes of islands in these regions were assessed to determine location and size of the most affected regions and islands. A map showing global extinction density was produced. Extinctions of passerine and non-passerine species on the islands in the various regions were analysed to determine whether the different orders experienced different levels of extinction in the different regions.

### *Phylogeny of extinction*

Avian orders and families were examined to determine if certain of these were more extinction prone than others. Orders that experienced the most extinctions were examined in greater detail. At the family level, families that experienced the most extinctions were listed and comparisons were drawn with families that have a large percentage of threatened species. Statistical analyses were performed to assess whether family diversity was linked in any way to extinction probabilities.

### *Body size*

Gaston and Blackburn (1995) state that it seems likely that body size may be used as a pointer to recognise which species are most at risk of extinction. Body sizes of species were used, where data were available, to determine if this was true for extinct species. As no sources listed data as to bird body size, Dunning (1993) was used to extract data on bird body mass. Dunning (*op. cit.*) listed very few extinct birds and in general, body masses of extinct species had to be inferred. This was done by examining species of the same genus and comparing body sizes with data contained in Fuller (1987) on bird length. If no comparison with Fuller (1987) could be made, the body sizes of all species listed in the affected genus was averaged. In doing this all but 14 extinct species were assigned a body mass. This is a very conservative methodology. However, it was selected as being one which would tend to mask rather than exaggerate body-size effects. A chronological analysis was performed to determine if, in certain time periods, birds of particular sizes were more prone to extinction than at other times. An analysis to examine whether a relationship existed between bird body size and island size was also carried out.

## ii. Threat data

Analysis of threatened taxa are based upon the data provided by Alison Stattersfield (BirdLife International) and information contained in Collar *et al.* (1994).

### *Data compilation*

Threatened species listed by Collar *et al.* (1994) were separated into their threat categories (critically threatened [including the four “extinct in the wild” species], endangered and vulnerable). Details of extant avian orders, families and species of the world were extracted from Clements (1991) and Monroe and Sibley (1993). Clements (1991), although a popular birdwatchers’ checklist, was used for the following reasons: Dunning (1993) used it as the taxonomic basis for his analysis and there was greater agreement as to taxon placement between Clements (1991) and Collar *et al.* (1994), particularly at the order and family level. Similarly, the sources from which the extinction data were obtained generally followed the older taxonomic treatment. Using both sources aided in analyses of threat to families and where there are differences, these are noted. There are taxonomic differences between Monroe and Sibley (1993) and Clements (1991) and these are summarised in Table 3.

Monroe and Sibley (1993) (hereafter M&S) list 23 orders containing 9702 species whereas Clements (1991) lists 31 orders containing 9455 species. M&S is based on Sibley and Ahlquist (1990) and Sibley and Monroe (1990), a classification derived from DNA-DNA hybridization. However, this classification is criticised by many authors; Sibley and Ahlquist (1990) by Raikow (1991), Krajewski (1991), O’Hara (1991) and Peterson (1992), and Sibley and Monroe (1990) by Siegel-Causey (1992). Siegel-Causey (1992) notes that Sibley and Monroe (1990) base their results on about 12% of avian species, inferring relationships for the other 88% in their classification, which he claims would be better termed an “arrangement”. Clements (1991) bases his specific treatment on Sibley and Monroe (1990) but uses Gill (1990) for higher taxonomy, which is more conservative. Clements (1991) and M&S were used jointly in this threat analysis. Where discrepancies arose, this is noted and numbers of species in affected families compensated for.

Table 3. Summary of taxonomic nomenclature differences between Monroe and Sibley (1993) and Clements (1991)

Clements (1991)	Monroe and Sibley (1993)	Orders listed by Clements which Monroe and Sibley subsume as families in their classification	Orders listed by Monroe and Sibley which Clements subsumed as families in his classification
<u>Orders (31)</u>	<u>Orders (23)</u>		
Tinamiformes	Tinamiformes	<u>Struthioniformes</u>	
Struthioniformes	Struthioniformes	Rheidae	
Rheiformes		Casuariidae	
Casuariiformes		Dinornithiformes as	
Dinornithiformes		Apterygidae	
		<u>Ciconiiformes</u>	
Ciconiiformes	Ciconiiformes	<i>Under sub-order</i>	
		<i>Charadrii</i>	
Charadriiformes		Charadriidae	
Pteroclidiformes		Pteroclididae	
		<i>Under sub-order Ciconii</i>	
Sphenisciformes		Spheniscidae	
Podicipediformes		Podicipedidae	
Procellariiformes		Procellariidae	
Pelecaniformes		Pelecanidae	
Phoenicopteriformes		Phoenicopteridae	
Falconiformes		Falconidae	
Gaviiformes		Gaviidae	
Anseriformes	Anseriformes		
Galliformes	Galliformes		
Gruiformes	Gruiformes		
Columbiformes	Columbiformes		
Psittaciformes	Psittaciformes		
Coliiformes	Coliiformes		
Musophagiformes	Musophagiformes		
Cuculiformes	Cuculiformes		
Strigiformes	Strigiformes	<u>Strigiformes</u>	
Caprimulgiformes		Caprimulgidae	
Apodiformes	Apodiformes		
Trochiliformes	Trochiliformes		
Trogoniformes	Trogoniformes		
Coraciiformes	Coraciiformes		
Piciformes	Piciformes		
	Turniciformes		Turnicidae under Gruiformes
	Craciformes		Cracidae under Galliformes
	Bucerotiformes		Bucerotidae under Coraciiformes
	Upupiformes		Upupidae under Coraciiformes
	Galbuliformes		Galbulidae under Piciformes
Passeriformes	Passeriformes		

Using these data, comparisons were drawn between orders and families that contained threatened species and those that did not. A comparison was also made between those orders and families that have experienced extinction of species and those that have not. In these comparisons, it was taken into account whether species were to be found on the mainland only, on islands only, or on both.

### *Causes of threat*

Collar *et al.* (1994) list ten causes of threat to birds. These are:

0. Unknown;
1. Loss or alteration of habitat;
2. Hunting, persecution (including accidental trapping), egg collecting (subsistence);
3. Disturbance (by humans, stock);
4. Fisheries;
5. Pollution, pesticides, poisoning (accidental);
6. Introduced species (predators, competitors, herbivores, diseases);
7. Trade, egg collecting (commercial);
8. Natural causes (exacerbated by other influences); and
9. Small range or population.

I have summarised these into the same five categories as used for extinctions in order to make comparisons between the historical causes of extinction and current causes of threat: causes 1 and 3 above were included in habitat alteration, 2 and 7 were included in exploitation, 4 and 5 were included in "other" and 8 and 9 are discussed below. The threat from introduced vertebrates differs from the definition of "introduced predators" as used for extinctions in that it does not take into account only the effect of predators. For extinctions, where introduced vertebrates were not predators, they were listed as "other" in order to isolate the specific influence of predators on avian extinction.

In a number of cases, especially in the case of critical and endangered species, a main threat (habitat destruction, introduced predators or exploitation) appeared together with natural causes (exacerbated by other causes) and/or small ranges or populations (causes 8 and 9 above). In cases where natural causes and/or small range or populations

accompanied the main causes; the main causes were considered as being the most important threats and are used in the analysis. Where natural causes and/or small range or populations were the only threat, the affected species were placed in the “other” category.

The number of species in each category of threat (critical, endangered and vulnerable) impacted by the above five threat types were arranged to show the following:

- the number of threatened species per family
- the number of species that fell into each of the three threat categories
- the number of species threatened by a particular threat type or combination of threats.

Using the above data, the most important threats were identified for (1) all threatened species, (2) only endangered species, and (3) only critically endangered species.

#### *Geography of threat*

A comparison between the number of threatened species found on islands, mainland areas and those inhabiting both was made. Threats were analysed to give an overview of which threats are most prevalent in the three respective range types.

The geographical distributions of endangered and critically endangered species were investigated in more detail. In these analyses the format used by Collar *et al.* (1994) was adopted in defining geographical regions. These regions were North America, Central America, South America, Africa, “Russia”, Asia and Australasia.

Countries and islands in these regions supporting endangered or critically threatened birds were identified and geographical comparisons were made between species with island and mainland ranges that fell within these two threat categories. Global threat density maps for the two categories were produced. Threat to endangered and critically threatened locally endemic species was also examined because it is over these species that much concern is expressed (e.g. Balmford and Long 1994, Pimm and Askins 1995).

### *Taxonomy of threatened species*

Family sizes were examined to test whether there is any relationship between family size and the number of threatened species. Families with 20% of their species under threat were listed. Families with only critical and/or endangered species were also examined.

### *Habitats of threatened birds*

More taxa are under threat in forests than in other habitats (Simberloff 1984, Diamond 1989, Balmford and Long 1994, Pimm and Askins 1995, Pimm *et al.* 1995, Brooks and Balmford 1996). Consequently, special attention was paid to the number of threatened species that live exclusively or partially in forests. This was done for all threat categories together to produce an overall picture, and subsequently for each category on its own to assess what proportions of forest-dwelling species are vulnerable, endangered and critical.

### *Body size, endemism, threat and extinction on ten selected islands*

Ten islands of various sizes accounting for a range of endemic avifauna were selected to test whether a relationship existed between body size, endemism, threat and extinction. Analyses were done for all endemic species and then only critical and endangered endemic avifauna. Correlations between the causes of extinction and current threat on these islands were made to determine if relationships between these existed. A coarser scale analysis was also performed to determine the distribution of extinct, extant and critical and endangered endemic avifauna on the ten islands.

### **iii. Prehistoric extinctions, historical extinctions and current threat**

A comparison was drawn between selected families that had experienced prehistoric extinctions (before 1600), historical extinctions (1600 to present) and which currently contain threatened species to test whether or not some families are more prone to extinction than others. The data were also used to assess whether certain families had passed through an "extinction filter" (*sensu* Balmford 1996).

#### **iv. Phylogenetic analysis**

Collar *et al.* (1984) use a classification approach that treats all species as equal. They apply the same criteria on which they base their results in the same way equally to all species. They do not attempt to consider species or family history or phylogeny in their approach and are thus not able to include any element of phylogenetic uniqueness in their threat status assessment.

The last section of this thesis attempts to include an element of "evolutionary uniqueness" using the species listed by Collar *et al.* (1994). This analysis considers (1) the historical predisposition of a family to extinction, (2) the proportion of the family under threat and (3) the phylogenetic uniqueness of the family.

## Chapter Two: The extinction of avifauna since 1600.

### Part 1 - Results

Since 1600, a minimum of 214 species and subspecies of birds have become extinct. Applying the criteria for species status listed in the methods section, this list is reduced to 138 avian species. Appendix 1 lists these species by order and family. This forms 1.44% of the total number of avian species known to have existed from that time. Of these extinctions, 124 were island taxa, 12 species had exclusively mainland distributions and two extinctions were of species that had ranges spanning both islands and mainland. Appendix 2 lists the remaining 76 cases classified at the level of subspecies or race.

### Chronology of extinction

From 1600 there was an escalating extinction rate until 1950 (Table 4). Since 1950 there has been a marked drop in extinction rate: 12 species having become extinct, this being the lowest extinction rate in the last 200 years. This rate is the same as in each of the two 50-year intervals between 1649 and 1749. The lowest number of extinctions occurred in the first 50-year period from 1600 - 1650 (n=6). The period with the highest rate of extinction was 1900 - 1949 when 33 species became extinct. In the preceding 50 years, 26 extinctions occurred, this being the next highest rate. Forty percent of the bird extinctions since 1600 have occurred in the 20th Century.

### **Chronology of mainland extinctions**

Twelve species have become extinct in mainland regions since 1600 (Table 5). The first documented mainland extinction was in 1800 when the Painted Vulture *Sarcorhamphus sacra* became extinct in Florida, USA (Day 1989). The most rapid mainland extinction rate occurred between 1900 and 1949 when five species (42% of mainland extinctions) became extinct. The

next 46 years saw the next highest rate having three mainland extinctions (24%). Sixty-seven percent of all mainland extinctions have occurred during the 20th Century.

### **Chronology of island extinctions**

One hundred and twenty four species have become extinct on islands since 1600 (Table 6). It is difficult to pinpoint the first extinction accurately; the only species for which there is a relatively precise date of extinction in the years 1600 - 1649 is the Greater Broad-billed Moa *Euryapteryx gravis* (1640). The remaining five species' extinction dates are not known precisely. The insular avian extinction rate peaked in the period 1900 - 1949, with 28 extinctions. The preceding half-century with 24 extinctions followed this. This 100-year year period accounted for 42% of insular extinctions. Since 1950 there has been a sharp reduction in island extinctions, only eight species having become extinct. One recent extinction date is unknown: that of Sharpe's Rail from Indonesia.

**Table 4. A chronological analysis of the causes of avian extinctions since 1600.**

For habitat type:

- I Island
- M Mainland
- B Both

For reasons

- Ex Exploitation of birds and/or eggs for food, trade or feathers and includes persecution.
- H.D. Habitat destruction
- I.V. Introduced predators (rats, cats, dogs, weasels)
- O Other (see text)

Date interval	Number of extinctions	Range type			Reasons								Totals		
		I	M	B	Ex	H.D.	I.V.	HD and IV	HD and Ex	Ex and IV	Unknown	Other		Percent of total	
1600-1649	6	6							1			5	4.3	6	
1650-1699	12	12			3				2			7	8.7	12	
1700-1749	12	12			4		1					7	8.7	12	
1750-1799	16	16			4	1	4		2			5	11.6	16	
1800-1849	20	17	2	1	2	2	4	2	2			8	14.5	20	
1850-1899	26	25	2		3	1	5	1	2	2		8	4	18.8	26
1900-1949	33	27	5		4	6	5	6	2			8	2	23.9	33
1949-1995	12	8	3	1		4	5		1			1	1	8.7	12
Dates unknown	1	1										1		0.7	1
Causes for both	2				1				1					1.4	2
<b>Totals</b>	<b>138</b>	<b>124</b>	<b>12</b>	<b>2</b>	<b>20</b>	<b>14</b>	<b>24</b>	<b>9</b>	<b>12</b>	<b>2</b>		<b>50</b>	<b>7</b>	<b>100</b>	<b>138</b>
<b>Percentages</b>	<b>100</b>	<b>90</b>	<b>9</b>	<b>1</b>	<b>14</b>	<b>10</b>	<b>17</b>	<b>7</b>	<b>9</b>	<b>1</b>		<b>36</b>	<b>5</b>		<b>100</b>

Table 5. A chronological analysis of mainland avian extinctions in species since 1600.

Date interval	Ex	H.D.	Ex and H.D.	H.D. and I.V.	Unknown	Percentages	Totals
1800-1849		1			1	17	2
1850-1899					2	17	2
1900-1949	1	1	1	1	1	42	5
1950-1995		3				25	3
Totals	1	5	1	1	4		12
Percentages	6	28	6	6	22	100	67

Table 6. A chronological analysis of the causes of avian extinctions on islands since 1600.

Date interval	Number of extinctions	Range types			Reasons								Percent of total	Totals	
		I	M	B	Ex	H.D.	I.V.	HD and IV	HD and Ex	Ex and IV	Unknown	Other			
1600-1649	6	6							1			5		5	6
1650-1699	12	12			3				2			7		10	12
1700-1749	12	12			4		1					7		10	12
1750-1799	16	16			4	1	4		2			5		13	16
1800-1849	20	17	2	1	1	1	4	2	2			7		14	17
1850-1899	27	25	2		3	1	5	1	2	2		6	4	19	24
1900-1949	32	27	5		3	5	5	5	1			7	2	23	28
1949-1995	12	8	3	1		1	5					1	1	6	8
Unknown cause	1	1										1		0	1
Cause for "both"	2				1				1						
Totals	138	124	12	2	18	9	24	8	10	2		46	7	100	124
Percentages	99	89	9	1	15	7	19	6	8	2		37	6	100	89

## Causes of extinction

Introduced predators, exploitation, habitat destruction and combinations thereof have accounted for 58% of avian extinctions since 1600 (Table 4). The causes of 50 (36%) extinctions are unknown. These are likely, however, to include the above factors which were either not observed or recorded by explorers and biologists of the day. Single factors as sole causes of extinction have been identified for 58 species and 23 species were affected by a combination of factors. During the 20th Century, 24 extinctions were caused by one factor only (habitat destruction and introduced predators alone accounted for 10 each) and nine extinctions were a result of a combination of factors. The causes of nine 20th Century extinctions are unknown. In the last 46 years, eight extinctions were caused by one factor only and three by combinations of factors (one cause is unknown).

Introduced predators such as cats, dogs, a snake species, weasels and especially rats have been the sole cause of the extinction of 24 species, and in combination with habitat destruction and exploitation, introduced predators have accounted for the loss of a further 11 species. Exploitation of birds for food and/or feathers has caused 20 extinctions and in combination with the other factors, a further 14 species have been affected. Habitat destruction has resulted in 14 extinctions; and, in conjunction with the other two factors has contributed to a further 21 extinctions.

Seven species have become extinct for reasons that could not be incorporated into the main three categories. The extinction of the Canary Black Oystercatcher *Haematopus meadewaldoi* was caused by competition with man for marine invertebrates (Hockey 1987). In the Hawaiian islands, introduced birds brought with them avian malaria, and this, together with competition with indigenous birds for common resources caused the extinction of six Drepanididae species (Warner 1968).

Two single causes and two combinations of causes have been responsible for the 12 mainland extinctions (Table 5). Habitat destruction has accounted for five extinctions alone, and in combination with other causes, a further two extinctions. Of the species with known extinction

causes, habitat destruction features in all mainland extinctions except one, the Carolina Parakeet *Conuropsis carolinensis* that became extinct through exploitation (hunting). Introduced predators have not been the sole cause of a single extinction on the mainland and feature in only one extinction.

The causes of insular extinctions (Table 6) are broadly the same as those for all extinctions. Insular extinctions, by virtue of their prevalence, shape the trend of all extinctions.

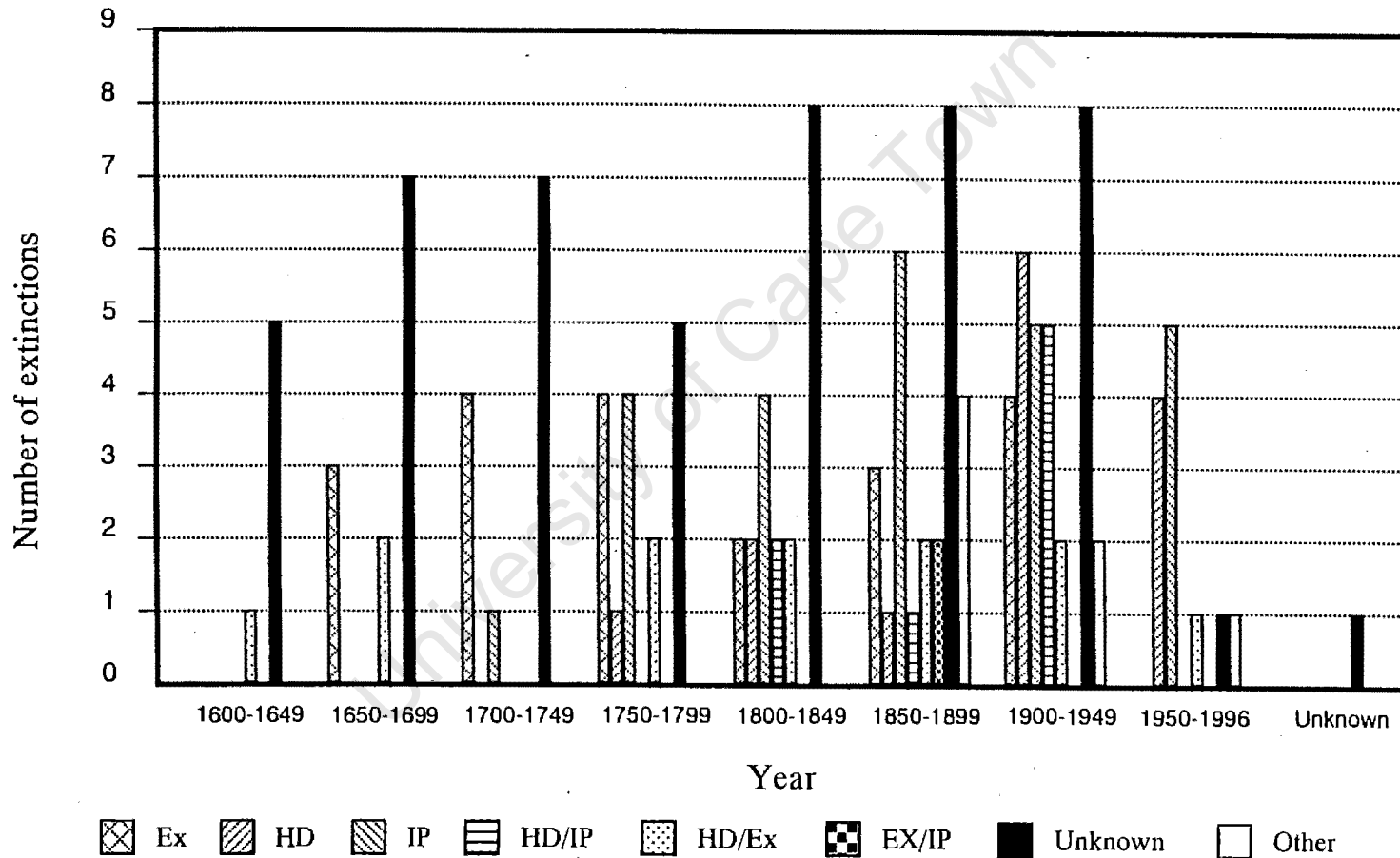
### **Cause and chronology**

The cause and chronology of avian extinction are summarised in Fig. 2. Unknown causes dominate all the 50-year intervals except 1950-1995. During the period 1600-1800, exploitation was the most frequently identified cause of extinction. Introduced predators were first responsible for an extinction in 1700 and by 1799 had become, along with exploitation, the primary known cause of extinction. Introduced predators have remained the commonest cause of extinction until the present except in the time period 1900-1949 when habitat loss was equally serious. Only in the period 1900-1950 do recorded combinations of factors feature strongly together with single causes. In this period habitat destruction and introduced predators accounted for 16 extinctions, five being as a result of a combination of these, five being as a result of introduced predators alone and six as a result of habitat destruction alone. However, it is likely that combinations of causes also featured in extinctions prior to this but were not recognised as such.

Until 1900, there was a gradual increase in the diversity of causes that played a role in extinctions. Between 1850 and 1899 all eight of the causes and many combinations played a role. Between 1950 and 1996 five causes have been identified as causing extinction, introduced predators and habitat destruction featuring most prominently.

For mainland extinctions the period 1900-1949 had the highest number of extinctions as well as the greatest variety of causes (5). Since 1950 three mainland species have become extinct, all as a result of habitat destruction.

Fig. 2. The chronology and causes of avian extinctions since 1600



## Geography of extinction

The 138 post-1600 global bird extinctions have occurred on 49 islands and in 11 mainland regions (Table 7). The Great Auk *Alca impennis* can not be attributed one island or mainland provenance as its range spanned most of the north Atlantic: this species was therefore excluded from geographic analyses. The Ivory-billed Woodpecker *Campephilus principalis*, the other species whose range included mainland and island habitat, occurred in Cuba and the USA. Both of these countries have experienced other extinctions and the species was included in the geographical analysis.

Of the 62 sites that have experienced extinctions, 41 experienced one extinction only. Thus 66% of sites experienced only 30% of the extinctions. Twenty-one sites (34%), all islands except Colombia, have experienced two or more extinctions and account for 90 extinctions (70%). Three or more extinctions were experienced at ten sites, all islands. These islands make up 16% of the total number of sites but account for 75 (54%) extinctions. Four islands experienced ten or more extinctions, affecting 49 species i.e. 6% of sites have experienced 36% of all extinctions.

### **Island location**

New Zealand has experienced the most extinctions (16), ten of these being moa extinctions. Hawaii has suffered 12 extinctions, followed by the Mascarenes (Mauritius, Rodrigues and Réunion) with 11, 10 and nine extinctions respectively. (The only mainland country to have experienced more than one avian extinction is Colombia, with two.)

Regions that have experienced island extinctions are the northern and southern Pacific and Atlantic Oceans, and the southern Indian Ocean (Table 8). The southern Pacific region has seen the most extinctions, 43 species having been lost from 18 islands. Sixteen of these were on New Zealand. This is followed by islands in the southern Indian Ocean (39 extinctions on 6 islands) and the northern Pacific Ocean (31 extinctions on 15 islands). In the southern Indian Ocean region, 33 of the 39 extinctions

were from the Mascarene Islands. In the northern Pacific, 17 of the 31 extinctions occurred on five islands in the Hawaiian Archipelago, 12 of these being on Hawaii (Fig. 3).

### **Island sizes**

Table 9 compares the sizes of islands that have experienced extinctions. Islands of 100-200 km<sup>2</sup> have experienced the most extinctions (15 on six islands) followed by islands of sizes between 1 500-2 000 km<sup>2</sup>. The number of extinctions in these two size ranges is not evenly spaced over the islands concerned. Ten of the 15 extinctions occurred on Rodrigues island (in the 100-200 km<sup>2</sup> size category) and 11 on Mauritius (in the 1 500-2 000 km<sup>2</sup> range, within which there are 15 extinctions on five islands). Islands with areas smaller than 100 km<sup>2</sup> have experienced nine extinctions on six islands.

On a coarser island-size resolution, 32 extinctions (23%) have occurred on 17 islands which have a surface area of less than 500 km<sup>2</sup>. In the area range 1 500-2 000 km<sup>2</sup>, 16 extinctions have occurred on five islands, although within this island size range, 12 extinctions have occurred on two islands with areas between 1 800-1 900 km<sup>2</sup>. (11 on Mauritius). Sixteen extinctions have also occurred on one of the larger islands, New Zealand. The next most affected island-size range are islands with areas of between 10 000-12 000 km<sup>2</sup>, where three islands have experienced a total of 15 extinctions. Of these, Hawaii experienced 12 extinctions. Réunion and Ryukyu islands have areas between 2 000-3 000 km<sup>2</sup> and these have experienced the next highest number of extinctions with 11 (nine were on Réunion).

**Table 7. Summary of the sites that have experienced avian extinctions since 1600** (Sources for island sizes are given in Table 8)

Place	Size (km <sup>2</sup> )	# of extinctions
New Zealand	269000	16
Hawaii	10464	12
Mauritius	1865	11
Rodrigues Island	104	10
Réunion Island	2510	9
Chatham Island	960	4
Tahiti	238	4
Mascarene Islands	4479	3
Seychelles	404	3
Lord Howe Island	17	3
Madagascar	594180	2
Jamaica	10991	2
Ryukyu Islands	2196	2
Guadeloupe Island (West Indies)	1780	2
Molokai Island	676	2
Guadelupe Island (Mexico)	298	2
Raiatea Island	238	2
Kosrae Island	109	2
Peel and Bonin Islands	104	2
Norfolk Island	36	2
Colombia		2
Indonesia	1919445	1
Sumatra and Borneo	1219916	1
Java	130987	1
Cuba	114525	1
New Caledonia	19105	1
Fiji Islands	18330	1
Bahamas	11406	1
Canary Islands	7275	1
Kangaroo Island	4351	1
French Polynesia	3940	1
Society and Cook Islands	1880	1
Bering Island	1593	1
Oahu Island	1536	1
King Island	1098	1
Martinique Island	1079	1
Choiseul Island (Solomon Islands)	1000	1
Dominica	751	1
Auckland Island	606	1
Tanna Island	549	1
Laysan Island	500	1
Guam	450	1
Lanai Island	365	1
Grand Cayman Islands	220	1

Table 7 (cont.)

ohnpei Island	177	
Moorea	132	1
Bonin Island	93	1
Ascension Island	88	1
Wake Island	8	1
Stephen Island	2.6	1
Carolina, USA		1
Eastern Punjab, India		1
Eastern USA		1
Florida, USA		1
USA		1
New England, Canada		1
Mexico		1
Guatemala		1
Paraguay, Uruguay, Brazil, Argentina		1
Australia		1
North Atlantic islands, Canada, UK,		1
Denmark, Faeroe Islands, Greenland,		
Russia		
SE USA and Cuba		1
		138

Table 8. Regional summary of sites that have experienced avian extinctions since 1600.

The key to the symbols next to the island area column is at the end of the table and gives the source from which the island sizes were obtained.

<u>N Pacific: (N of the Equator)</u>	<u>Number of extinctions</u>	<u>Area (km<sup>2</sup>)</u>	
Sumatra and Borneo	1	1219916	a,d
Hawaii Island	12	10464	e
Ryukyu Islands	2	2196	a
Bering Island	1	1593	c
Oahu Island	1	1536	e
Molokai Island	2	676	c
Laysan Island	1	500+	c
Guam	1	450	a
Lanai Island	1	365	c
Guadelupe Island (Mexico)	2	298	c
Pohnpei Island	1	177	b
Kosrae Island	2	109	c
Both Bonin and Peel islands	2	104	f
Bonin Islands	1	93	a
Wake Island	1	8	a
	31		
Passerines	21		
Non-passerines	10		
<u>S Pacific: (S of Equator)</u>			
New Zealand	16	269000	b
Java	1	130987	c
New Caledonia	1	19105	a
Fiji Islands	1	18330	a
Kangaroo Island	1	4351	c
French Polynesia	1	3940	a
Society and Cook Islands	1	1880	a
King Island	1	1098	c
Tahiti	4	1042	a
Choiseul Island (Solomon Islands)	1	1000	c
Chatham Island	4	960	b
Auckland Island	1	606	c
Tanna Island	1	549	c
Raiatea Island	2	238	a
Moorea	1	132	c
Norfolk Island	2	36	a
Lord Howe Island	3	17	c
Stephen Island	1	2.6	f
	43		
Passerines	10		
Non-passerines	33		

Table 8 (cont.)

N Atlantic islands:

Cuba	1	114525	a
Bahamas	1	11406	d
Jamaica	2	10991	c
Canary Islands	1	7275	a
Guadeloupe Island (West Indies)	2	1780	a
Martinique Island (WI)	1	1079	a
Dominica	1	751	a
Grand Cayman Islands	1	220	d
	10		

Passerines 1  
Non-passerines 9

S Atlantic islands

Ascension Island (Non-passerine)	1	88	a
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S Indian Ocean islands:

Indonesia	1	1919445	a
Madagascar	2	594180	a
All three Mascarene Islands	3	4479	a
Réunion	9	2510	a
Mauritius	11	1865	a
Seychelles	3	404	a
Rodrigues	10	104	a
	39		

Passerines 7  
Non-passerines 32

Mainland

Australia	1		
Eastern Punjab, India	1		
Eastern USA	1		
Carolina, USA	1		
Florida, USA	1		
USA	1		
New England, Canada	1		
Guatemala	1		
Mexico	1		
Colombia	2		
Paraguay, Uruguay, Brazil, Argentina	1		
	12		

Passerines 3  
Non-passerines 9

Table 8 (cont.)

Both mainland and island

SE USA and Cuba		1
N. Atlantic		1
		<hr/>
		2
Passerines	0	
Non-passerines	2	
<u>Totals:</u>		
Passerines		42
Non-passerines		96
		<hr/>
		138

Reference key:

a	Times Atlas of the World (1975)
b	Graves (1990)
c	Goetz (1968)
d	Cook (1981)
e	Pratt <i>et al.</i> (1987)
f	Fuller (1987)

University of Cape Town



Table 9. Comparison between island size and extinction frequency

Island size (km <sup>2</sup> )	Number of extinctions	Number of islands affected
0 - 100	9	6
100 - 200	15	5 (10 on Rodrigues)
200 - 300	3	3
300 - 400	1	Lanai
400 - 500	4	2
500 - 600	2	2
600 - 700	3	2
700 - 800	1	Dominica
800 - 900	0	0
900 - 1000	4	Chatham Island
1000 - 1500	7	4
1500 - 2000	16	5 (11 on Mauritius)
2000 - 3000	11	2 (9 on Réunion)
3000 - 10000	6	4
10000 - 12000	15	3 (12 on Hawaii)
18330	1	Fiji islands
19105	1	New Caledonia
114525	1	Cuba
130987	1	Java
269000	16	New Zealand
594180	2	Madagascar
1219916	1	Borneo and Sumatra
1919455	1	Indonesia

### Endemicity

Of the 138 extinct species, perhaps only one was not endemic to a particular island or island group or to a localised mainland region. The Great Auk inhabited a region that stretched across the entire north Atlantic from Canada to Russia including Iceland, Greenland, Denmark, the Faeroe Islands, Funk Island and the UK (Fuller 1987). Some species inhabited an island group, amongst these being the Red-moustached Fruit Dove *Ptilinopus mercierii*, found on islands in French Polynesia and Grace's Emerald *Chlorostilbon bracei* in the Bahamas (IUCN e-mailed list). On the mainland, the Glaucous Macaw *Anodorynchus glaucus* was found in four countries in South America. In most cases, however, the species that became extinct were restricted to one island or country only. In only 24 cases did extinct species inhabit an island group, two or more islands in close proximity, or more than one country.

## Migratory birds and extinction

Of the 138 extinctions, 133 species were non-migratory. Two species to have become extinct were almost certainly migratory, the Labrador Duck *Camptorhynchus labradorius* and the Passenger Pigeon (Fuller 1987). The Great Auk, the New Zealand Little Bittern *Ixobrychus novaezelandiae* and Townsend's Finch *Spiza townsendi* might have been migratory but there is little proof of this (Fuller 1987).

## Phylogeny of extinction

### Orders

Nineteen of the current avian orders (23 according to Monroe and Sibley (1993) and 31 according to Clements (1991)) have experienced historic extinctions. One order, the Aepyornithidae, has lost all its species. The following section details extinction rates and causes of five orders that have experienced the highest number of extinctions. The orders examined are the Passeriformes (30% of all recent extinctions (n=42)), the Psittaciformes with (n=21), the Gruiformes (n=15), Columbiformes (n=12) and Dinornithiformes (n=10). Together, these orders account for 72% of all bird extinctions since 1600.

### *Passeriformes*

The order Passeriformes hold the most families and species so it is not surprising that this order has experienced the most extinctions. It is best put into context when comparing all the species in the order that have become extinct since 1600 (42) with the number of species, extinct and extant, that have existed from 1600 (5781 - Monroe and Sibley 1993). These 42 extinct species thus account for only 0.73% of the Passeriformes that have existed since 1600, much less than the average of 1.44% for all bird species. Seven of the 12 extinctions that have occurred since 1950 have been passeriform and almost 50% of all passerine extinctions have occurred this century (Table 10). The highest rate of passerine extinction occurred between 1850 and 1949, however, when 25 species became extinct. The 19th Century saw 18 extinctions, only two less

than the 20th Century. The period 1600-1799 saw only 4 passerine extinctions. This order contains seven of the nine most recent extinctions, all of which occurred on islands. The other two most recent extinctions are of Podicipediformes. Only three passerine species have been lost from mainland areas, one each in North, Central and South America, the two most recent being in 1910 and 1912. Of the 42 passerine extinctions, habitat loss features in 15 cases, introduced predators in 14, and the causes of 13 extinctions are unknown or uncertain. Exploitation is known to be the cause of only one extinction, the Huia *Heteralocha acutirostris* of New Zealand.

Table 10. Chronology of passeriform extinctions.

Date	'00 - '49	'50 - '99	Total
1600 - 1699	1	1	2
1700 - 1799	1	1	2
1800 - 1899	6	12	18
1900 - 1996	13	7	20

### *Psittaciformes*

The highest extinction rate of psittaciforms occurred between 1750 and 1849 (Table 11). The 20th Century has seen only three psittaciform extinctions, all in mainland areas and each on a different continent. These are the only mainland extinctions in the order. There has not been a psittaciform extinction on an island since 1885 when the Cuban Red Macaw *Ara tricolor* became extinct. Of the 21 extinctions, exploitation and/or habitat destruction has featured in 13 cases. Introduced predators feature in four cases while the causes of seven extinctions are uncertain or unknown. Five percent of all Psittaciformes to have existed since 1600 have become extinct, almost 3.5 times the average for all bird species.

Table 11. Chronology of psittaciform extinctions.

Date	'00 - '49	'50 - '99	Total
1600 - 1699	0	1	1
1700 - 1799	1	6	7
1800 - 1899	5	5	10
1900 - 1996	2	1	3

## Gruiformes

As with the passerines, the highest number of extinctions among the Gruiformes occurred between 1850 and 1949 (Table 12). The most recent extinction was in 1973 in Fiji, this also being the only gruiform extinction since 1945. All gruiform extinctions are from the rail family and all have occurred on islands. Introduced predators have featured in seven extinctions, exploitation in five and habitat destruction in three. Causes of two extinctions are uncertain or unknown. Of all the gruiform species that have existed since 1600, 7% have become extinct, almost 5 times the average for all birds. The date of one gruiform extinction (Sharpe's Rail *Rallus sharpei*) is unknown.

Table 12. Chronology of gruiform extinctions.

Date	'00 - '49	'50 - '99	Total
1600 - 1699	0	3	
1700 - 1799	1	0	1
1800 - 1899	2	2	4
1900 - 1996	5	1	6

## Columbiformes

The period 1850-1950 saw the highest extinction rate amongst the Columbiformes when five species became extinct (Table 13). The 18th and 20th centuries have each experienced four extinctions. The most recent columbiform extinction, the island-dwelling Ryukyu Wood Pigeon *Columba jowyi*, occurred in 1936. Only one extinction in this order has occurred on the mainland, that being the extinction of the Passenger Pigeon in the southeastern USA. This order includes perhaps the most well known avian extinction, that of the Dodo *Raphus cucullatus*. Exploitation has been a cause of five extinctions (including the Dodo and Passenger Pigeon), introduced predators and habitat destruction have featured in four and three cases respectively, and the causes of a further two extinctions are unknown. Four percent of all columbiform species that existed since 1600 have become extinct, more than double the average for all birds.

Table 13. Chronology of columbiform extinctions.

Date	'00 - '49	'50 - '99	Total
1600 - 1699	0	1	1
1700 - 1799	2	2	4
1800 - 1899	2	1	3
1900 - 1996	4	0	4

### *Dinornithiformes*

Over half of the dinornithiform (moa) extinctions occurred in the 18th Century (Table 14). Only one species has become extinct post-1765, the Lesser Megalapteryx *Megalapteryx didinus* (by 1850). The moas were endemic to New Zealand. Habitat destruction and exploitation are the documented causes of extinction for three of the ten species, the remaining seven causes being uncertain or unknown. Of all the dinornithiform species to have existed since 1600, 77% have become extinct. All three surviving relatives of the moas, the kiwis (Apterygidae), are endangered (Collar *et al.* 1994).

Table 14. Chronology of dinornithiform extinctions.

Date	'00 - '49	'50 - '99	Total
1600 - 1699	2	1	3
1700 - 1799	5	1	6
1800 - 1899	0	1	1
1900 - 1996	0	0	0

### Families

Forty-five avian families have experienced extinctions, 16 passerine and 29 non-passerine. The families that have experienced the highest number of extinctions are the Psittacidae (20), Rallidae (15), Drepanididae (11) and Dinornithidae (10) (Table 15). In the most severely impacted orders it was characteristic that the extinctions were confined to only one family. This was completely true for the Gruiformes and Dinornithiformes where all extinctions were within the Rallidae and Dinornithidae respectively. It was 95% true for the Psittaciformes (one

extinction not in the family Psittacidae), and 67% true for the Columbiformes (eight species of Columbidae becoming extinct and four (all) species of Raphidae).

Three families have lost all member species, the Dinornithidae (ten extinctions), the Raphidae (four extinctions) and the Aepyornithidae (one extinction). Two-thirds of the family Dromaiidae have become extinct and 40% of the family Acanthisittidae. There are only one and three extant species in each respective family, but these are not threatened. Thirty-five percent of the family Drepanididae have become extinct and, of the 21 extant species, 16 (76%) are threatened.

Proportional extinction rates are highest in small families. Of the 12 families that have lost over 10% of their species since 1600, only the Rallidae has more than 20 extant species. Larger families tended to experience a greater number of extinctions, e.g. the Psittacidae (20 extinctions), Rallidae (15), Columbidae (8) and Sturnidae (7), but the proportional extinction rate has been lower (except for the Rallidae).

Table 15. Listing of families showing (1) the number of species within each that have become extinct since 1600 and (2) the current threat situation of extant species.

Family	Number of species extinct	Percentage of species extinct	Number of Extinctions on islands	Percentage extinctions on islands	% of all species in the family to have become extinct since 1600	# of species currently threatened	# extant species in these families	% of species currently threatened
Psittacidae	20	14	17	85	5	88	349	25
Rallidae	15	11	15	100	11	32	132	24
Drepanididae	11	8	11	100	35	16	21	76
Dinornithidae	10	7	10	100	100	0	0	0
Columbidae	8	6	7	88	3	55	310	18
Sturnidae	7	5	7	100	6	7	144	5
Anatidae*	5	4	4	80	3	25	128	20
Meliphagidae	4	3	4	100	2	11	179	6
Ardeidae	4	3	4	100	6	7	65	11
Raphidae	4	3	4	100	100	0	0	0
Turdidae	3	2	3	100	2	32	176	18
Strigidae	3	2	3	100	4	20	155	13
Dromaiidae <sup>†</sup>	2	1	2	100	67	0	1	0
Podicipididae	2	1	0	0	10	4	22	18
Falconidae	2	1	2	100	3	6	62	10
Phasianidae	2	1	1	50	1	48	175	27
Scolopacidae	2	1	2	100	2	10	88	11
Tytonidae	2	1	2	100	11	5	17	29
Acanthisittidae	2	1	2	100	40	0	3	0
Sylviidae*	2	1	2	100	0	36	261	14
Zosteropidae	2	1	2	100	2	21	93	23
Emberizidae <sup>†</sup>	2	1	0	0	0	31	612	4
Pycnonotidae	2	1	2	100	2	12	138	9
Aepyornithidae	1	0	1	100	100	0	0	0

Table 15 (cont.)

Hydrobatidae	1	0	1	100	4	1	22	5
Procellariidae	1	0	1	100	1	27	78	35
Phalacrocoracidae	1	0	1	100	2	8	37	22
Ciconiidae	1	0	1	100	5	5	26	19
Threskiornithidae	1	0	1	100	3	7	33	21
Cathartidae*	1	0	0	0	13	1	7	14
Haematopodidae†	1	0	1	100	7	1	10	10
Alcidae*	1	0	0	0	4	1	22	5
Charadriidae	1	0	1	100	2	9	78	12
Lorridae	1	0	1	100	2	0	53	0
Cuculidae	1	0	1	100	1	8	78	10
Trochilidae	1	0	1	100	0	27	322	8
Alcedinidae	1	0	1	100	1	11	86	13
Pachycephalidae	1	0	1	100	2	0	59	0
Acanthizidae	1	0	1	100	100	0	34	0
Muscipidae*	1	0	1	100	0	20	117	17
Picidae	1	0	0	0	0	8	216	4
Icteridae	1	0	0	0	1	8	97	8
Ploceidae	1	0	1	100	0	16	118	14
Fringillidae*	1	0	1	100	0	8	170	5
Callaeidae	1	0	1	100	33	1	2	50
Totals	138	100	124	90		633	4,492	14

\* Monroe and Sibley (1993) classify this as a sub-family and Clements (1991) and Collar *et al.* (1994) a family.

† Monroe and Sibley (1993) classify this as a tribe and Clements (1991) and Collar *et al.* (1994) a family.

## Body size and extinction

Body masses of extinct species were inferred from data contained in Dunning (1993) and are summarised in Appendix 1. For some species it was not possible to infer body mass with any confidence (these are marked “?” in Appendix 1) resulting in 126 species being included in this analysis. Although Appendix 1 lists 127 body masses, the extinction date of one species is not known and not included here. Body masses ranged from 3 g to 500 000 g with a median of 334 g.

Birds with masses between 10-30 g experienced the most extinctions (24) followed by those with masses between 50-100 g and 100-200 g (Table 16). The fewest extinctions have occurred in the mass ranges < 10 g and 1 000-2 000 g (3), and 2 000-5 000 g and > 50 000 g (4). Birds in six of the 11 size ranges were exclusively island species; these ranges are marked with an asterisk in Table 16. The very largest and very smallest species were included in these.

Table 16. Chronology of extinction of specific-sized birds on all islands

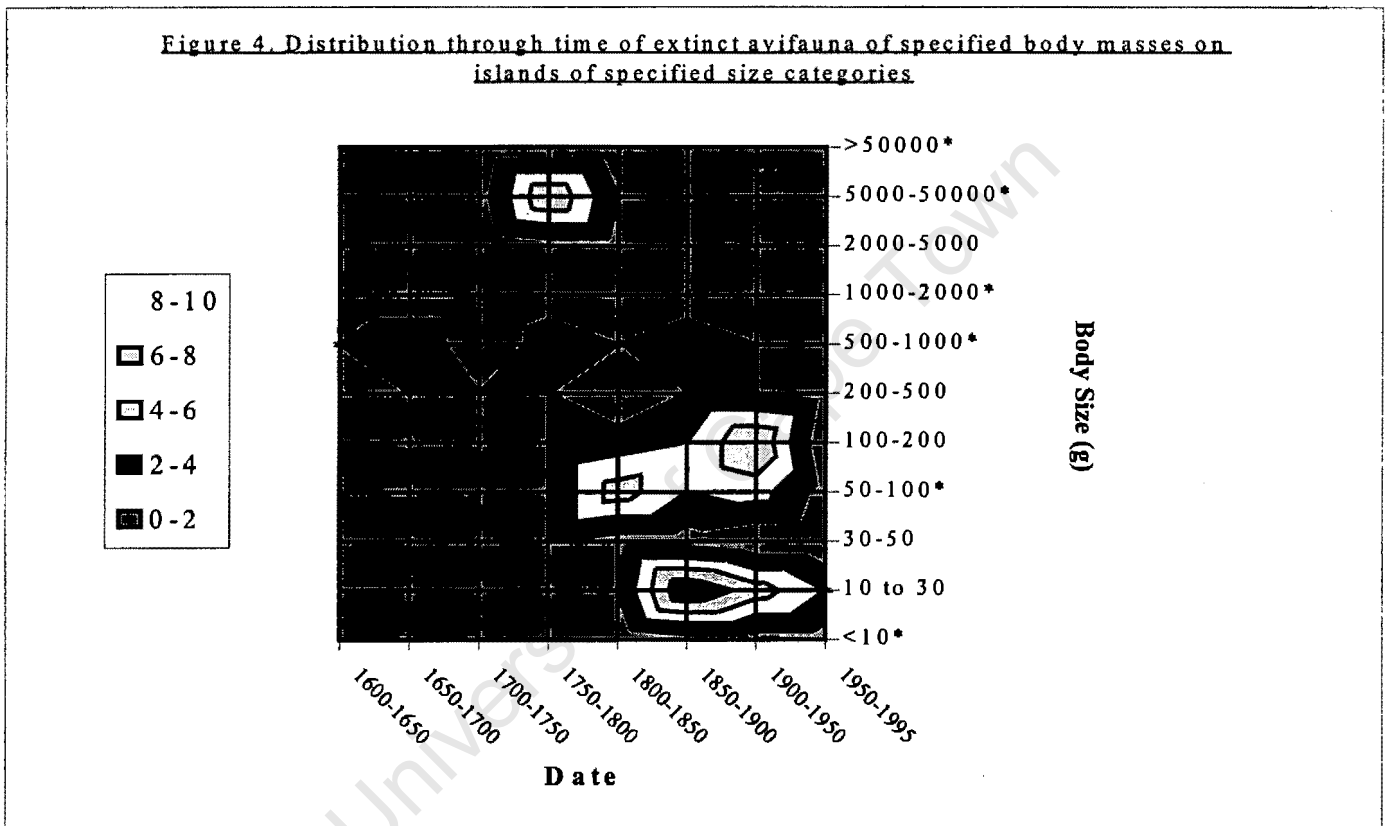
Size (g)	Time period								Totals
	1600-1650	1650-1700	1700-1750	1750-1800	1800-1850	1850-1900	1900-1950	1950-1995	
<10*						1	1	1	3
10-30		1			2	10	7	4	24
30-50	1	1		2	1	1			6
50-100*			1	2	7	4	5	1	20
100-200			2	2	3	4	8		19
200-500		2	2	2		2	2	1	11
500-1000*	2	4		3	2	3	2	2	18
1000-2000*				1		1		1	3
2000-5000	1	1		1	1				4
5000-50000*	1	2	1	8	2				14
>50000*	1	2				1			4
Totals	6	13	6	21	18	27	25	10	126

The date of the extinction of one species is unknown and not included in this table.

Table 16 also shows the time periods in which the particular size categories were affected. Birds of masses between 500-1 000 g became extinct over the greatest number of time periods (7). Only between 1700-1750 has a species in this mass range not become extinct, all of the other time periods experiencing multiple extinction. This size category has experienced the fourth highest number of extinctions. Only three birds of size >1 000 g have become extinct in the last

150 years, six in the last 200. This is less than in both the 100-year time intervals prior to 1800. There was no correlation between any one bird size going extinct over any one time period.

Figure 4 indicates a trend towards an increasing proportion of small species becoming extinct in the past 200 years. A greater number of comparatively larger birds (> 500 g) were affected between 1600-1800.

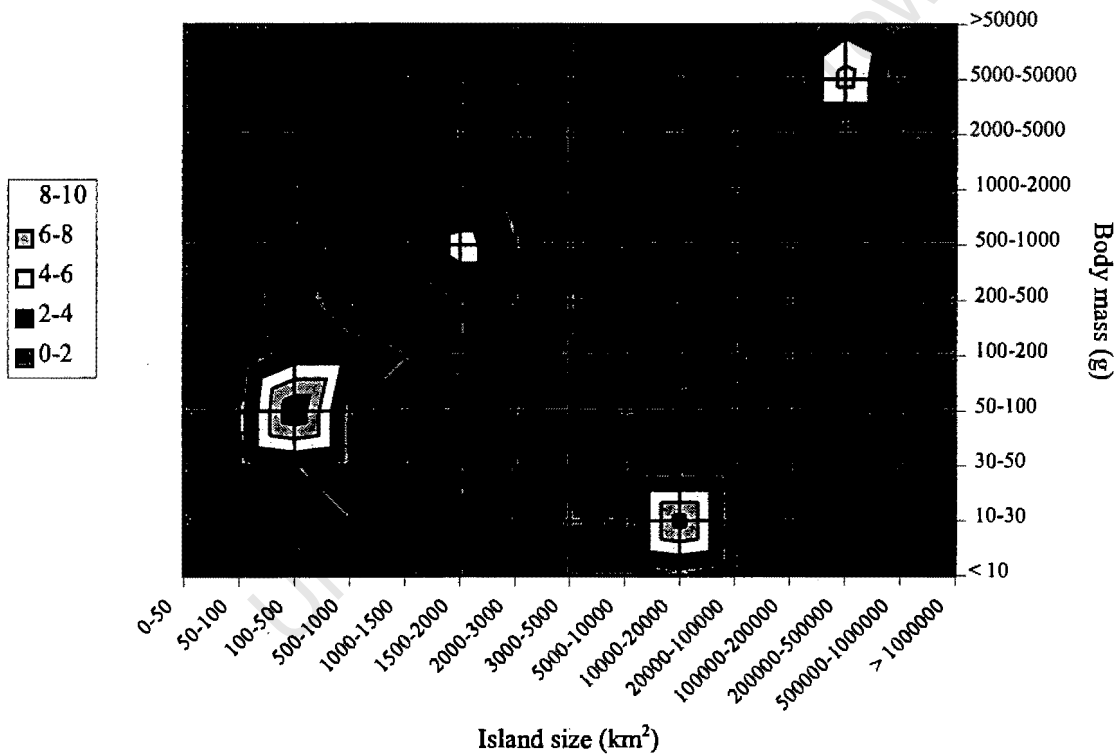


An increase in the incidence of smaller birds (<500 g) becoming extinct is especially evident in the time intervals 1800-1950 where there were 12, 21 and 29 smaller bird extinctions in each respective 50-year interval, or 67%, 84% and 88% of the extinctions in these time intervals. These numbers are higher than in any the time intervals pre-1800 for these sizes. Between 1950 and present there has been a drop in the number of extinctions in this range (7) but these nonetheless make up 70% of all post-1950 extinctions.

Body size, island size and extinction

Although there is no statistically significant correlation between the body masses of extinct birds and island size, Fig. 5 does indicate a few basic patterns which could be predicted from a positive relationship between body size and home range (and hence an inverse relationship with population density). Very large birds (> 50 000 g) are confined to (and have been lost from) the largest islands. Similarly, over 50% of the small birds (< 500g) have been lost from islands < 1 000 km<sup>2</sup> in area.

Figure 5. The relationship between body mass and island size for extinct avifauna on all islands



## Part 2 - Discussion

### Prehistoric extinctions

The total number of named species (plant and animal) stands between 1.5 and 1.8 million, of which more than 80% are animal. There is uncertainty as to how many species there may be with estimates ranging from 3 million to 80 million or more (May 1988, Stork 1988, Ehrlich 1993, Gaston 1994). Smith *et al.* (1993b) estimate the number of animal species extant today to be about 1.4 million, of which known extant avian species make up approximately 9500 (0.68%). Clements (1991) puts this figure at 9455 and Monroe and Sibley (1993) at 9702.

The average "life span" of higher vertebrate species (fish, reptiles, amphibians, birds and mammals) is estimated to be between 200 000 years and 2 million years (Ehrlich *et al.* 1977), giving a background extinction rate of between 0.2 and 2.0 species per million species per year. Raup (1988) and Wilson (1992) calculated a background extinction rate of one species per million species per year, which is used by Ehrlich (1994) and Stevens (1995a) as the best available figure; this figure is also used by Pimm (1995) for avian species.

Archaeological finds on tropical Pacific islands indicate that more recent prehistoric human activity resulted in the extinction of large numbers of land birds. (Milberg and Tyrberg (1993) define prehistoric as "times previous to the appearance of written sources" and list species from islands that were colonised between 200 and 9 000 years ago - *cf.* pg. 70). Fossil evidence from well studied islands in the Pacific suggest that prehistoric humans caused the extinction of as many as 2000 endemic landbird species across the Pacific (Olson 1989, Steadman 1995). The Polynesians first colonised Pacific islands from New Zealand in the south, to Hawaii in the north and east to Easter Island from around AD 400. They are thought to have extirpated between 500 and 1000 bird species (Pimm *et al.* 1994). Milberg and Tyrberg (1993) use these figures to refute the

notion that “primitive people” were “natural conservationists” who lived in a state of ecological balance without any appreciable effect on the environment.

Pimm (1995) places the avian extinction rate in the Pacific alone over the last two thousand years at one species per ten thousand species per year and terms this rate the “conservative global rate of extinction”. Comparisons with background extinction rates show that, even when using this conservative extinction rate, species are being lost 100-1000 times faster than these background rates (May *et al.* 1995, Pimm *et al.* 1995). That these extinction rates are so much higher than the background rate prompted Diamond (1989) and Pimm (1995) to suggest that we are in the midst of a mass extinction, the cause being the impact of man.

Milberg and Tyrberg (1993) state that, in some cases, the extinction of a species could not be separated into “pre-European” and “European” phases as extinction could be a long, drawn-out process. Some species mentioned in this analysis may have been approaching extinction when the first European explorers arrived, e.g. the moas (Anderson 1989), the Raiatea Parakeet *Cyanoramphus ulietanus*, Bay Thrush *Turdus ulietanus* and Mysterious Starling *Aplonis mavornata* (Olson 1986, Fuller 1987).

### Historical Extinction Rates

Since 1600, there have been 251 documented higher-vertebrate extinctions (Smith *et al.* 1993b, this study). Avian extinctions account for 55% of these. This high proportion is probably an artefact of birds (and mammals) being well studied, both in intensity and geographically, when compared to other taxa (Diamond 1987, Gaston and May 1992). It does, however beg two questions: (1) are there other taxa that would be found to have experienced higher degrees of extinction if they had been studied as intensively as birds and mammals; and (2) would some taxa show more extinctions if their status was more widely studied on a global scale (all recorded fish extinctions bar one are from North America and Mexico - Gaston and May 1992)?

In 1600, it is assumed that 9840 avian species were in existence (using 138 extinct species and Monroe and Sibley's (1993) figure of 9702 extant species). Given the above background extinction rate, the extinction rate of avian species can be calculated in species per million species per year using the formula:

$$X = \frac{a \cdot 10^6}{(9840 - b) \cdot 10^2}$$

where:  $X$  is the extinction rate in species/million species/per year (Table 17).  
 $a$  is the number of extinctions in a 100-year period.  
 $b$  is the cumulative number of extinctions since 1600 until the relevant time period. This provides the number extant species at the start of that time period.

Table 17. Rates of avian extinction from 1600 until present in species per million species per year.

<i>Period</i>	<i>Extinction rate (species/million species/year)</i>
1600 - 1699	18.7
1700 - 1799	29.2
1800 - 1899	49.2
1900 - 1995	44.2
1600 - 1995	35.9

Myers (1979) presented two statistics: (1) the estimated extinction rate of animals between the years 1600 to 1900 was about one every four years; and (2) the estimated extinction rate for 1900 to present was about one species per year. Both these figures are clearly underestimates. Considering avian species alone, there were 93 extinctions in the years 1600 to 1900, this is an extinction rate of approximately one every three years. Between 1900 and present there have been 44 extinctions, an extinction rate of almost one every two years. As birds represent only 0,68% of known animal species, total

animal extinction rates must be higher than this. King (1980) suggests the rate of avian extinction may increase to one species per six months by the end of the century.

For each 100-year time period the avian extinction rate is markedly higher than the background extinction rate. The overall avian extinction rate from 1600 until 1995 is 36 species per million species per year. There was a peak extinction rate between 1850 and 1950 of 51 species per million species per year.

An historical avian extinction rate of approximately 36 species per million species per year translates to 360 000 avian extinctions per million years, using a baseline of 10 000 extant avian species. This is very much higher than Pimm's (1995) background avian extinction rate of one extinction per million species per year. For the 400 year period covered in this study, the extinction rate was one species per 30 000 species per year. Considering only the last 200 years, this rate increases to one species per 20 000 species per year. This is approximately half the rate at which the Polynesians are estimated to have caused bird extinctions on Pacific islands (Pimm 1995).

The sharp increase in extinction rate in the 19th Century coincides with European colonial expansion, which was made partly possible by the industrial revolution (Smith *et al.* 1993b). The utilitarian attitude towards nature was one of the primary causes of extinctions in this time; directly in the form of exploitation for food as in the case of the Spectacled Cormorant *Phalacrocorax perspicillatus* or indirectly through the introduction of predators and destruction of indigenous habitats, as in the cases of the Chatham Island Fernbird *Bowdleria fufescens* and Bonin Wood Pigeon *Columba versicolor* respectively (Greenway 1967, Day 1989). The impact of the Europeans was felt throughout the world, and the elevated extinction rate probably reflects the escalating exploitation of natural resources to fuel the growth of industrial capitalism (Humphries and Fisher 1994). This is supported by Ehrlich (1994) who shows that a correlation exists between rates of extinction and total energy consumption by man.

## Causes of historical extinction

### **Introduced predators**

Introduced predators have been the most pervasive cause of extinction on islands. These alien, vertebrates were introduced accidentally or deliberately from continents by the colonising powers. The first period after the introduction of a new predator is expected to be particularly stressful to the indigenous fauna because the predator population typically increases beyond the carrying capacity of the island as easily accessible prey are over-exploited (Bell 1977, Ebenhard 1988).

Historically, oceanic islands mostly lacked mammalian predators, with the result that endemic birds, in contrast to those on continents, had lost the behavioural adaptations that would have allowed them to co-exist with the predators: for example, many taxa are flightless. Of the predators that have been introduced, rats (*Rattus rattus*, *R. norvegicus* and *R. exulans*) and cats (*Felis catus*) have had the most significant impacts (Moors *et al.* 1992). Birds nesting on the ground or in burrows are at greatest risk from *R. norvegicus*, whereas tree-nesting birds are at greatest risk from *R. rattus*. *Rattus rattus* has caused greater losses of forest birds on oceanic islands than any other rat in recent times, while in the same period *R. norvegicus* has caused greater losses amongst sea birds (Atkinson 1985). One cat caused the extinction of an entire species. The Stephen Island Wren *Xenicus lyalli* was exterminated by a cat named Tibbles, who belonged to the lighthouse keeper on the island, over the space of about a month (Fuller 1987).

Size and behaviour determine a species' vulnerability to rats. Larger birds and birds with aggressive behaviour towards rats (evolved as a result of native predators) are probably better able to protect nests from rats or other introduced predators (Moors and Atkinson 1984, Atkinson 1985).

Introduced birds may also have an effect on the endemic avifauna. Grant (1995) suggests that the impact of introduced mynahs on endemic birds of the Hawaiian islands may have been underestimated. The mynahs are known to eat other birds' eggs.

### **Exploitation**

Exploitation has led to the extinction of many more island birds than mainland birds. Food and feathers were the main motivations behind the exploitation of birds. They were most often taken for food by hungry sailors, e.g. the Dodo, Spectacled Cormorant and Great Auk. In a few cases their feathers were taken for decoration, e.g. Lebat's Conure *Aratinga labati* and the Huia (Day 1991).

Exploitation is known to have been responsible for only two mainland extinctions. These were the Carolina Parakeet and the Passenger Pigeon, both hunted from super-abundance to extinction in the USA (Blockstein and Tordoff 1985, Fuller 1987). The Passenger Pigeon was hunted for food and sport and the Carolina Parakeet for sport and as a pest as it ate crops, although Day (1989) suggests this alone should not have led to its extinction.

### **Habitat destruction**

Although responsible for more island than mainland extinctions (9 compared with 5), proportionally, habitat destruction has been a much more important factor in mainland extinctions than on islands. In mainland areas, it has alone been responsible for 42% of extinctions and, in combination with other factors, for a further 25%. All known causes of mainland avian extinctions involve habitat destruction and all of the mainland extinctions in the last 50 years were due entirely to habitat destruction.

Habitat destruction caused more insular avian extinctions during 1900-1950 than in any other time period (n=5). The Hawaiian islands experienced three of these (two on Hawaii and one on Laysan). Habitat destruction affected mainly passerines during the last

century; only one of the six extinctions, the Laysan Rail *Porzana palmeri*, was non-passerine.

### **Unknown**

The causes of fifty avian extinctions (36%) are unknown. Some of these extinctions could be assigned causes with a high degree of probability based on the knowledge of the causes of extinction in other sympatric species. For example, the seven moa extinctions of unknown cause were probably a result of exploitation and habitat destruction.

Unknown causes may also have been not-so-obvious ecological spin-offs from habitat destruction, exploitation and introduced predators. It is likely that there were other, non-avian extinctions that occurred in places that experienced avian extinctions. These extinctions may have been a food source to some avian species, which themselves subsequently became extinct. Janzen and Martin (1982) and Witmer and Cheke (1991) propose that the extinction of an important seed disperser is likely to alter the composition of the vegetation even when it is not directly affected by man. This alteration may be enough to result in the extinction of species dependent on the “old” habitat for food or nesting. The extinction or near extinction of the endemic Hawaiian plants of the genus *Hibiscadelphus* caused the secondary extinctions of several of its honeycreeper pollinators (Diamond 1989).

Islands where there have been more than one extinction may represent examples of “extinction cascades”. Here, an extinction of one species in a complex system could lead to an “extinction cascade” which would affect many species in the system (Diamond 1989). For example, human removal of top predators (jaguars, pumas and harpy eagles) on Barro Colorado Island caused a population surge in medium-sized predators (monkeys and coatimundis) on which the top predators habitually preyed. A surge of medium-sized predators subsequently led to extinctions of ground-nesting birds without any further intervention by man (Terborg and Winter 1980).

## **Combinations of factors**

It is likely that combinations of causes also featured more significantly in extinctions than recorded prior to 1900. In the 17th and 18th Centuries, factors acting in combination may have been overlooked, only later becoming apparent with improved scientific method, observation and recording. Perceptions as to the importance of combinations of factors in causing extinction may have changed over time whereas their incidence may have remained fairly constant.

As well as extinction pressures acting in combination with each other, specific attributes of the birds themselves may predispose them to the effects of such multiple pressures. Flightless or near flightless species like the Dodo, the moas and some rails would be predisposed to the pressures of both introduced predators and exploitation by man for food. On isolated islands lacking indigenous predators, the lack of an escape response towards predators and man resulted in many species succumbing to these dual threats, a case in point being the Laysan Rail (Fuller 1987).

The flocking behaviour of the Passenger Pigeon may have also predisposed it to extinction. These birds relied on communal protection (Blockstein and Tordoff 1985) and, once the great flocks had been destroyed, it may have been only a matter of time before the remaining birds became extinct. The extinction of this species was almost inconceivable in the mid-19th Century, today it stands as perhaps the most spectacular of recent extinctions.

## Geography of historical extinctions

### **Island extinctions**

Ninety percent of avian extinctions since 1600 have occurred on islands. This accords with the figure calculated by Johnson and Stattersfield (1990) and is slightly below King's (1985) estimate of 93%.

#### *Island size*

There is no clear correlation between island size and the absolute (rather than proportional) probability of extinction. Species have become extinct from islands of all sizes, ranging from very small e.g. Stephen's Island (2.6 km<sup>2</sup>) and Wake Island (8 km<sup>2</sup>) to very large e.g. Sumatra and Borneo, together covering an area of 1 219 916 km<sup>2</sup>. Both small and large islands have experienced one extinction only or many extinctions: Ascension Island (88 km<sup>2</sup>) and Java (130 987 km<sup>2</sup>) have only experienced one extinction each, whereas Rodrigues (104 km<sup>2</sup>) and New Zealand (269 000 km<sup>2</sup>) have lost comparatively large numbers of species.

#### *Oceanic regions*

The most extinctions in any region have occurred in the southern Pacific (43). All the islands that have experienced three and four extinctions are situated in this region. Only two islands in this region experienced two extinctions. The highest number of affected islands (as well as the island experiencing the most extinctions - New Zealand) are situated in the southern Pacific. There were more non-passerine extinctions than passerine extinctions, which was typical of all the regions except the northern Pacific.

The northern Pacific region has experienced the third most extinctions (after the southern Pacific region and the Indian Ocean region). The island of Hawaii experienced 12

extinctions whereas other islands in the region lost only one or two species. In this region there were more passerine extinctions than non-passerine extinctions; it is the only region in which this has occurred. This is due mainly to the extinctions on the Hawaiian islands: 16 of the 21 passerine extinctions in the region occurred here.

In the northern Atlantic region, all of the extinctions except one have occurred in the Caribbean. Single extinctions per island are typical and only two islands have experienced two extinctions. Nine of the ten extinctions were non-passerine. The southern Atlantic has only one island that has experienced an extinction (Ascension Island), this being a non-passerine extinction. The Atlantic Ocean as a whole has lost relatively few species in historical times.

All of the extinctions in the Indian Ocean occurred on islands south of the Equator. With the exception the southern Atlantic, this oceanic region has the least number of affected islands (6), but has experienced the second highest number of extinctions. These six islands have experienced an average of 6.6 extinctions each, the highest of all the regions. The three Mascarene islands were most severely affected, accounting for 33 of the 39 extinctions. This island group has lost twice as many species as the Hawaiian island group. Thirty-two of the 39 Indian Ocean extinctions were of non-passerines.

#### *Islands most severely affected*

Tables 18a-e document the chronology and causes of avian extinctions on the five islands that have lost the most species. New Zealand and Hawaii each had one family that was particularly heavily impacted, the Dinornithidae and the Drepanididae respectively. These families accounted for two thirds and three quarters of the historical extinctions on these islands respectively (Table 19). The Mascarene islands experienced 33 extinctions across a comparatively large number of families. (Tables 18c-e each incorporates the extinction of the three species that inhabited all three islands.)

Table 18a. Chronology and causes of avian extinctions on New Zealand

<u>Year</u>	<u>Cause</u>					<u>Total</u>
	Ex	IP	Ex,HD	HD,IP	Unknown	
1600-1649			1		1	2
1650-1699			1			1
1700-1749					5	5
1750-1799			1			1
1800-1849						0
1850-1899				1	2	3
1900-1949	1			1		2
1950-1996		2				2
	1	2	3	2	8	16

Table 18b. Chronology and causes of avian extinctions on Hawaii

<u>Year</u>	<u>Cause</u>					<u>Total</u>
	HD	IP	Ex,HD	HD, comp disease	Unknown	
1600-1649						
1650-1699						
1700-1749						
1750-1799						
1800-1849						
1850-1899	1	1	1	4	1	8
1900-1949	2					2
1950-1996	1			1		2
	4	1	1	5		12

Table 18c. Chronology and causes of avian extinctions on Mauritius

<u>Year</u>	<u>Cause</u>			<u>Total</u>
	Ex	IP	Unknown	
1600-1649			1	1
1650-1699	2		4	6
1700-1749	2			2
1750-1799			1	1
1800-1849		1	3	4
1850-1899				0
1900-1949				0
1950-1996				0
	4	1	9	14

Table 18d. Chronology and causes of avian extinctions on Rodrigues

<u>Year</u>	<u>Cause</u>				<u>Total</u>
	Ex	IP	Ex,IP	Unknown	
1600-1649				1	1
1650-1699				1	1
1700-1749		1		3	4
1750-1799	3			1	4
1800-1849				2	2
1850-1899			1		1
1900-1949					0
1950-1996					0
	3	1	1	8	13

Table 18e. Chronology and causes of avian extinctions on Réunion

<u>Year</u>	<u>Cause</u>				<u>Total</u>
	Ex	HD	IP	Unknown	
1600-1649				1	1
1650-1699				4	4
1700-1749	1				1
1750-1799	1			1	2
1800-1849		1		2	3
1850-1899			1		1
1900-1949					
1950-1996					
	2	1	1	8	12

New Zealand and Hawaii are the largest of the five islands and are also the ones most recently affected by extinction, the last Mascarene extinction being in 1876 (Table 20). New Zealand has had two historical extinction “episodes”, one between 1600 and 1750 when nine species became extinct (all moas) and one between 1850 to the present when seven species have become extinct. Hawaii has had only one “episode”, between 1850 to present, when 12 species became extinct. On these two islands, habitat destruction alone or in combination with some other factor (exploitation on New Zealand and competition and disease on Hawaii) was the primary cause of extinction, resulting in 15 of the 28 extinctions (Table 19).

Table 19. Summaries of avian extinctions and their causes on the five islands that have experienced the most extinctions. (Causes from Appendix 1)

a.) New Zealand

Order	Family	Common Name	Scientific Name	Date	Cause
Dinornithiformes	Dinornithidae		<i>Dinornis maximus</i>	1850	?
		Slender Moa	<i>Dinornis torosis</i>	1670	Ex,HD
		Greater Broad-billed Moa	<i>Euryapteryx gravis</i>	1640	Ex,HD
			<i>Euryapteryx geranoides</i>	Before 1700	?
			<i>Anomalopteryx parvus</i>	Before 1800	?
			<i>Anomalopteryx didiformes</i>	Before 1800	?
			<i>Anomalopteryx oweni</i>	Before 1800	?
		Lesser Megalapteryx	<i>Megalapteryx didinus</i>	1765	Ex,HD
			<i>Megalapteryx hectori</i>	Before 1800	?
			<i>Megalapteryx benhami</i>	Before 1800	?
Ciconiiformes	Ardeidae	New Zealand Little Bittern	<i>Ixobrychus novaezelandiae</i>	1900	?
Galliformes	Phasianidae	New Zealand Quail	<i>Coturnix novaezelandiae</i>	1868	?;HD,IP
Strigiformes	Strigidae	Laughing Owl	<i>Sceloglaux albifacies</i>	1910	HD,IP
Passeriformes	Acanthasittidae	Bush Wren	<i>Xenicus longipes</i>	1965	IP
	Pachycephalinae	Popio	<i>Turnagra capensis</i>	1955	IP
	Callaeidae	Huia	<i>Heteralocha acutirostris</i>	1907	Ex

b.) Hawaii

Order	Family	Common Name	Scientific Name	Date	Cause
Gruiformes	Rallidae	Sandwich Rail	<i>Porzana sandwichensis</i>	1898	IP
Passeriformes	Meliphagidae	Kioea	<i>Cheatoptila augustipluma</i>	1860	??
		Hawaian O'o	<i>Moho nobilis</i>	11934	HD
	Drepanididae	Great Amakihi	<i>Verido sagittirostris</i>	1900	HD
		Greater Koa Finch	<i>Psittirostra palmeri</i>	1896	HD, disease, competition or all 3
		Akiola	<i>Hemignathus obscurus</i>	1960	HD, disease, competition or all 3
		Lesser Koa Finch	<i>Psittirostra flaviceps</i>	1891	HD, disease, competition or all 3
		Kona Finch	<i>Psittirostra kona</i>	1894	HD, disease, competition or all 3
		Mamo	<i>Drepanis pacifica</i>	1899	Ex,HD
		Kona Grosbeak	<i>Chloridops kona</i>	1894	HD, disease, competition or all 3
		Kakawihie	<i>Paroreomyza flammea</i>	1963	HD
		Ula-Ai-Hawane	<i>Ciridops anna</i>	1892	?,HD

c.) Mauritius

Order	Family	Common Name	Scientific Name	Date	Cause
Ciconiiformes	Ardeidae	Mauritius Night Heron	<i>Nycticorax mauritianus</i>	By 1700	?
Anseriformes	Anatidae	Mauritian Duck	<i>Anas theodori</i>	1696	?
		Mauritian Shellduck	<i>Alopochen mauritianus</i>	1698 ?	?
Gruiformes	Rallidae	Mauritian Red Rail	<i>Aphanapteryx bonasia</i>	1693	Ex
		Mascarene Coot	<i>Fulicia newtoni</i>	1693	?
Columbiformes	Raphidae	Dodo	<i>Raphus cucullatus</i>	1655	Ex
	Columbidae	Dutch Pigeon	<i>Alectroenus nitidissima</i>	1835	?,IP
Psittaciformes	Psittacidae	Mauritius Grey Parrot	<i>Lophopsittacus bensoni</i>	1765	?
		Broad-billed Parrot	<i>Lophopsittacus mauritanus</i>	1680	?
		Mascarene Parrot	<i>Mascarinus mascarinus</i>	1834	?
Strigiformes	Tytonidae	Mauritius Barn Owl	<i>Tyto sauzieri</i>	1700	?, Ex
		Newton's Barn Owl	<i>Tyto newtoni</i>	1700	?, Ex
	Strigidae	Commerson's Scops Owl	<i>Scops commersoni</i>	1836	?
Passeriformes	Sturnidae	White Mascarene Starling	<i>Necropsar leguati</i>	1840	?

d.) Rodrigues

Order	Family	Common Name	Scientific Name	Date	Cause
Procellariiformes	Procellariidae	?	<i>Pterodroma sp.</i>	1726	?
Ciconiiformes	Ardeidae	Rodrigues Night Heron	<i>Nycticorax megacephalus</i>	1761	?
Gruiformes	Rallidae	Legaut's Rail	<i>Aphanapteryx leguati</i>	1760	Ex
		Mascarene Coot	<i>Fulica newtoni</i>	1693	?
Columbiformes	Raphidae	Rodrigues Solitaire	<i>Pezohaps solitarius</i>	1765	Ex
	Columbidae	Rodrigues Pigeon	<i>Columba rodericana</i>	1726	?, IP
Psittaciformes	Psittacidae	Rodrigues Parrot	<i>Necropsittacus rodericanus</i>	1761	Ex
		Rodrigues Ring - necked Parakeet	<i>Psittacula exul</i>	1876	?, Ex, IP
		Mascarene Parrot	<i>Mascarinus mascarinus</i>	1834	?
Strigiformes	Strigidae	Rodrigues Little Owl	<i>Athene murivora</i>	1726	?
Passeriformes	Sturnidae	Rodrigues Starling	<i>Necropsar rodericanus</i>	1726	?
		White Mascarene Starling	<i>Necropsar leguati</i>	1840	?
	Pycnonotidae	?	<i>Hypsipetes sp.</i>	1600's	?

e.) Réunion

Order	Family	Common Name	Scientific Name	Date	Cause
Ciconiiformes	Ardeidae	?	<i>Nycticorax sp.</i>	By 1700	?
	Ciconidae	?	<i>Ciconia sp.</i>	By 1674	?
	Threskiornithidae	Réunion Flightless Ibis	<i>Borbonibis latipes</i>	1773	?
Falconiformes	Falconidae	?	<i>Falco sp.</i>	1674	?
Gruiformes	Rallidae	Mascarene Coot	<i>Fulica newtoni</i>	1693	?
Columbiformes	Raphidae	Réunion Dodo / Solitiare	<i>Raphus solitarius</i>	1715	Ex
		White Dodo	<i>Victoriornis imperialis</i>	1770	Ex
Psittaciformes	Psittacidae	Réunion Ring - necked Parakeet	<i>Psittacula eques</i>	1800	HD
		Mascarene Parrot	<i>Mascarinus mascarinus</i>	1834	?
Passeriformes	Plocidae	?	<i>Foudia sp.</i>	1671	?
	Sturnidae	Réunion Crested Starling	<i>Fregilupus varius</i>	1860	IP
		White Mascarene Starling	<i>Necropsar leguati</i>	1840	?

Table 20. Chronological analysis of extinction on the five most severely affected islands

Year	N.Z.	Hawaii	Mauritius	Rodrigues	Réunion	All three Mascarene Islands	Total
1600-1649	2		1	1	1		5
1650-1699	1		5	0	3	1	10
1700-1749	5		2	4	1		12
1750-1799	1		1	4	2		8
1800-1849			2	0	1	2	5
1850-1899	2	8		1	1		12
1900-1949	3	2					5
1950-1996	2	2					4
	16	12	11	10	9	3	61

In the Mascarene islands, all extinctions occurred before 1877 (Table 19). There was a steady number of extinctions from 1650 until 1850, 11, seven, seven and nine extinctions occurring in the consecutive 50-year time periods. Unknown factors contributed to the highest number of extinctions (19 of 33). Of the known factors, exploitation was the most important, resulting in ten extinctions (one in combination with another factor). From these islands an entire family has become extinct, the Raphidae. This family contained only four species, two of which were endemic to Rodrigues. The Raphidae is one of two recently extant families which has lost all its species.

In Hawaii and the Mascarenes a single factor led to the extinction of many species. On Hawaii it was habitat destruction and on the Mascarenes it was exploitation. On Hawaii the most recent extinctions also involve habitat destruction and the most important current causes of threat to endangered and critical species are habitat destruction and introduced predators (Collar *et al.* 1994). Avian malaria is also an important threat to bird species on Hawaii and is included by Collar *et al.* (1994) with introduced species in their threat codes. New Zealand may have two prominent causes if it is assumed that the extinction of the moas was driven by exploitation and habitat destruction. Here, however, the two most recent cases of extinction are ascribed to introduced predators and these, together with habitat alteration, are the most important threats to critical and endangered species in New Zealand. On the Mascarenes there has not been an extinction for 120 years, but Collar *et al.* (1994) report that there are currently nine endemic species in the endangered and critical categories. The causes of threat on Mauritius and Rodrigues are habitat destruction and introduced predators: on Réunion, exploitation remains the greatest threat.

### *Islands experiencing between two and four extinctions.*

Fourteen islands fell into this grouping (Table 21), more species becoming extinct in the first 50 years of this century than in any other time period. In the last 47 years, there has been only one extinction on these islands, the lowest rate since 1750. Extinctions on all but two of the 14 islands are spread over a number of time periods. Molokai and Guadeloupe Islands have only lost species in the 20th Century. Of the four extinctions on these islands, habitat destruction was responsible for three. Overall, however, of the known causes of extinction on these 14 islands, the most important has been introduced predators (Table 22). Predators have also accounted for the most recent extinction on these islands. The next most important known cause was exploitation. Introduced predators do not seem to have affected species on the two largest islands in this grouping, viz. Jamaica and Madagascar.

### *Islands experiencing one extinction*

Thirty islands have experienced single avian extinctions (Table 23). The extinction rate on these islands peaked in the time period 1900-1949 when 14 species became extinct; the time period 1950-1996 saw the lowest number of extinctions since 1750, consistent with general trend in extinction rates. Island sizes ranged from very small to large and there was no correlation between island size and extinction probability. Bird body sizes ranged from large to small and no relationship was found between body size and probability of extinction on these islands. Eighteen of the 30 islands were tropical. Twelve of the birds on these tropical islands were comparatively small (< 200 g), all the passerine species (7) being <80 g. Considering all 30 islands, over two thirds of the species were non-passerine.

Of the known causes of extinction, habitat destruction alone accounted for the most extinctions. It was not, however, as over-ridingly important as were exploitation and introduced predators on islands that have experienced more than one extinction. When viewing combinations of all the factors, habitat destruction played a role in 16 extinctions, exploitation in 11 and introduced predators in ten. There were 12 extinctions from unknown causes, all between 1800 and the present.

Table 21. Chronological summary of avian extinction on islands experiencing between two and four extinctions.

Island	1600	1650	1700	1750	1800	1850	1900	1950	Total
Chatham Island		1			1	1	1		4
Tahiti				1	1		2		4
Seychelles						2		1	3
Lord Howe Island					1		2		3
Peel and Bonin Island					1	1			2
Jamaica				1	1				2
Norfolk Island						1	1		2
Raiatea Island				2					2
Ryukyu Island					1		1		2
Guadeloupe Island			1	1					2
Kosrae Island					1	1			2
Molokai Island							2		2
Guadelupe Island							2		2
Madagascar		1					1		2
	0	2	1	5	7	6	12	1	34

Table 22. A summary of the causes of extinction on islands experiencing between two and four avian extinctions.

Island	Ex	HD	IP	Ex/HD	Ex/Iv	HD/IP	Other	Unknown	Total
Chatham Island			1			2		1	4
Tahiti	1		3						4
Seychelles			1					2	3
Lord Howe Island	1		1					1	3
Peel and Bonin Island			2						2
Jamaica								2	2
Norfolk Island	1							1	2
Raiatea Island			2						2
Ryukyu Island								2	2
Guadeloupe Island	1			1					2
Kosrae Island			2						2
Molokai Island		1				1			2
Guadelupe Island	1					1			2
Madagascar				2					2
Total	5	1	12	3	0	4	0	9	34

Table 23. Cause and chronology of avian extinction on islands experiencing a single extinction.

Date	Cause								Total
	Ex	HD	IP	Ex/HD	Ex/IP	HD/IP	Other	Unknown	
1600-1649									0
1650-1699	1								1
1700-1749									0
1750-1799			1	1					2
1800-1849					2		1		3
1850-1899	1	1	1	1	1			1	6
1900-1949	2	3	2				1	1	11
1950-1996			2					1	3
Unknown								1	1
	4	5	6	3	1	2	1	8	30

### Some conclusions

On the five islands that have experienced a large number of extinctions, habitat destruction was the most important known factor on the larger islands of New Zealand and Hawaii. On the smaller Mascarene islands most extinctions were a result of habitat destruction and exploitation (although here, over two-thirds of the causes are unknown). The impact of introduced predators may have been missed as a result of poor scientific observation, the majority of the extinctions of unknown cause occurring before 1800. Birds on the five islands ranged in size from very large (moas and Raphidae) to small (Bush Wren *Xenicus longipipes* and Rodrigues Starling *Necrospar rodericanus* on New Zealand and Rodrigues respectively). Many of the Hawaiian extinctions were of small birds belonging to a single family (Drepanididae).

On islands that have experienced between two and four extinctions, introduced predators were the cause in most cases. The species affected were from across the body size range. The islands affected were generally smaller than 1000 km<sup>2</sup>. On these islands only one species has become extinct in the last 47 years, perhaps indicating that on these smaller islands, endemic species prone to extinction (through introduced predators and exploitation) had become extinct before 1900 (cf. Pimm *et al.* 1994).

On islands that have experienced single extinctions, there appears to be little relationship between island size and the body size of extinct species. Although habitat destruction played a role in the most extinctions in these islands, it was not significantly more important than introduced predators and exploitation as causative agents.

### **Mainland extinctions**

Regions that human populations have expanded into and filled over the last 400 years have recorded extinctions. In parts of the world that have a long history of human occupancy, there have been relatively few extinctions recorded over the last 400 years (Europe, much of continental Asia, Africa). This suggests that extinctions in these regions took place before 1600 (Smith *et al.* 1993b). There have been no avian extinctions in Europe in the last 400 years and only one on the Asian mainland, the Himalayan Mountain Quail *Ophrysia superciliosa* in the early 1870's. There have also been no avian extinctions in Africa in the past 400 years. The advent of colonialism in Africa does not seem to have had as great an impact on African avifauna as has been the case elsewhere. There have, however, been nine mammalian extinctions in this time (Day 1989).

Since 1600, 10 bird species have become extinct in the Americas. Five of these were in North America, two in Central America and three in South America. Together these make up 83% of all mainland extinctions. Both the earliest recorded and the most recent mainland extinctions occurred here. Habitat destruction was the most important cause of extinction, being solely responsible for five extinctions and jointly responsible for five. It is likely that even in the demise of the Carolina Parakeet, habitat destruction, and not only exploitation (for food, feathers and sport), played a role. As indigenous habitat was cleared to make way for farmlands, the birds became to be regarded as pests as they fed on crops and were shot (Day 1989). The causes of extinction of three species in the Americas are unknown.

The two non-American extinctions were the Himalayan Mountain Quail in the 1870's and Australia's Paradise Parrot *Psephotus pulcherrinus* in 1927. The cause of the former's extinction is unknown and that of the latter a combination of habitat destruction and introduced predators (Fuller 1987, Day 1989).

The three most recent mainland extinctions were from central and South America (two grebes and a macaw). These extinctions form one quarter of all historical mainland extinctions and constitute the highest rate of mainland extinction since 1600. This lends support to the concern that exists over the threat to South American bird species which have restricted ranges and specialised habitat requirements (Myers 1988, Brooks and Balmford 1996).

### Taxonomy of extinction

#### **Orders**

Four orders have lost 10% or more of their species, the Aepyornithiformes (100%), Dinornithiformes (77%), Casuariiformes (27%) and Podicipediformes (10%). Extinct species in the first three orders lived on islands, whereas the two extinct podicipediforms inhabited Guatemala and Colombia. One family in each order contained all the extinct species, the Aepyornithidae (one species), Dinornithidae (moas, ten species), Casuariidae (emus, two species) and the Podicipedidae (grebes, two species).

A combination of habitat destruction and exploitation were the causes of all the extinctions in these orders except the grebes, where habitat destruction alone was responsible. For the unknown causes of the moa extinctions, it is reasonable to assume that the known causes (exploitation and habitat destruction) accounted for these.

Extinctions among the Aepyornithiformes, Dinornithiformes and Casuariiformes occurred before the sharp rise in the extinction rate between 1850 - 1950; the podicipediform extinctions occurred after this.

## **Families**

Intuitively, a greater proportion of species in small families has become extinct than in larger families. It would take only a few extinctions (in some cases only one) to affect a large proportion of the species complement of small families. The Callaeidae, for example, had only three extant species in 1600, one of which became extinct, resulting in a loss of one third of the family.

The greatest absolute numbers of extinctions have occurred in large families. The Psittacidae, with 360 extant species in 1600, have experienced the most extinctions (20), representing 6% of the extant species at the time.

Passerines make up over half the number of extant avian species. On the basis of these numbers it not surprising that 30% of post-1600 extinctions are of passerines. Of the known causes of passerine extinction, habitat destruction and introduced predators featured in all but one case, highlighting the vulnerability of this order to man's impact through these two agents.

Although non-passerines form less than half of the avifaunal compliment, they have experienced 70% of the extinctions in the last 400 years. This would indicate that the extinction pressures exerted in this time period, especially introduced predators and exploitation, affected non-passerines more severely than passerine species. The generally larger non-passerines (e.g. moas, larger parrots, dodos) were targeted for exploitation for food by colonising Europeans whereas smaller, ground-dwelling species were more at risk from introduced predators (e.g. rails).

### Prehistoric extinctions

Milberg and Tyrberg (1993) have documented 41 avian families that experienced prehistoric (pre-1600) extinctions. They define prehistoric as "times previous to the appearance of written sources" and list species from islands that were colonised between 200 and 9 000 years ago. Table 24 details prehistoric extinctions of some selected families (data from Milberg and Tyrberg (1993)). One hundred and seventy seven of the 200 documented prehistoric extinctions are included. Families excluded experienced fewer than five extinctions.

The families with the greatest number of species which became extinct in prehistoric times are the Rallidae (34), Anatidae (25) and the Drepanididae (23). Species in these families were lost mostly from Pacific islands. Seven families accounted for almost two-thirds (135) of the recorded pre-historic extinctions.

Table 24. The number of prehistoric bird extinctions from selected families. (After Milberg and Tyrberg 1993).

Family	Mediterranean	Atlantic Ocean	Caribbean	Indian Ocean	Pacific Ocean	Total
Aepyornithidae				7		7
Dinornithidae					13	13
Procellariidae	1	2			2	5
Anatidae	2		1	2	20	25
Acciptiridae	1		4		8	13
Megapodiidae					5	5
Rallidae			4	1	29	34
Scolopacidae			2		3	5
Columbidae	1		1		11	13
Psittacidae			2		3	5
Tytonidae	2		5		1	8
Strigidae	3		6		5	14
Drepanididae					23	23
Corvidae	2		1		4	7
Total	12	2	26	10	127	177

The causes of prehistoric extinctions cannot be determined. As is the case for much recent extinction, the ultimate cause of extinction may be obscure or its importance difficult to evaluate. Milberg and Tyrberg (1993) list five causes that they believe were important in

prehistoric extinctions: over-exploitation, introduced predators, habitat destruction, depletion of food supplies, and disease. These can be grouped into the causes listed in this study.

Large birds were probably more at risk from over-exploitation than small birds which were more at risk from introduced predators such as *Rattus exulans* (*Rattus rattus*, *R. norvegicus* and feral cats were not spread by prehistoric man - Milberg and Tyrberg 1993). The importance of habitat destruction is likely to have varied between islands, but New Zealand, Easter Island and islands in the Mediterranean probably were heavily impacted by habitat loss (Milberg and Tyrberg 1993).

The majority of documented prehistoric extinctions occurred on islands in the Pacific, followed by Caribbean and Mediterranean islands. Islands in the Indian and Atlantic Oceans (excluding Caribbean islands) experienced relatively few losses. This may simply be because there are fewer islands in these regions (compared to the Pacific and Caribbean regions) and therefore fewer birds. Fourteen of the 41 families listed by Milberg and Tyrberg (1993) did not experience extinctions on Pacific islands. Island size does not seem to have had an effect on the severity of extinctions; the large islands of New Zealand, Cuba and the smaller Hawaiian islands all lost a large part of their prehistoric avifauna (Milberg and Tyrberg 1993).

### Extinction filters

At the end of the Pliocene (2 mya.), sea temperatures dropped dramatically with the onset of Northern-Hemisphere glaciation. In the Caribbean this resulted in the extinction of an estimated 36% of the molluscan genera and subgenera by the early Pleistocene (Jackson 1995). In subsequent and equally severe Pleistocene cycles of warming and cooling and associated sea-level changes, there was relatively little impact on the surviving Caribbean molluscs. An explanation for this is that the initial exposure to climatic changes purged

marine faunas of thermally sensitive taxa, leaving behind a core of species that were relatively resilient to further temperature fluctuations (Jackson 1995). Species less resilient to climatic change are thus filtered out.

Extinction filters may be used to explain the vulnerability of biotas to modern day challenges. Introduced rats have been one of the greatest anthropogenic causes of recent avian extinctions (Milberg and Tyrberg 1993, Moors *et al.* 1992), but the vulnerability of island avifaunas to these has differed widely. Some rat introductions had catastrophic effects on the island avifauna but in other cases the introduction of rats has been followed by the co-existence of rats and native birds (Milberg and Tyrberg 1993). A possible explanation of these differences may lie in the presence or absence of indigenous predators.

Islands that have historically supported native rodents (e.g. Christmas Island and the Galapagos Islands) appear to have avifaunas that are relatively resistant to rats (Atkinson 1985). The generally lower vulnerability of birds on tropical, as opposed to temperate islands in terms of threat from predators, may be linked to the historical distribution of land crabs, potentially important predators of chicks (Atkinson 1985). In these cases, the retention of anti-predator traits may have ensured that native birds were less susceptible to introduced rats than were birds from islands that lacked land crabs.

The growing awareness of the scale of extinctions caused by prehistoric humans suggests that, as well as climatic and biotic factors, humans may have selectively purged naive biotas of particularly vulnerable species (Balmford 1996). This long-term, human-induced filtering of vulnerable taxa has probably occurred elsewhere. This may provide an additional explanation for the apparent lack of extinctions following extensive habitat modification of Europe and North America (Balmford 1996).

Table 24 indicates that, to a certain degree, there was a prehistoric filtering of species before the advent of colonialism. On islands of the Pacific ocean, the proportion of recent

bird species that have become extinct or are endangered has decreased as time since colonisation increased (Pimm *et al.* 1994). The islands of the western Pacific, those occupied first by humans, have had fewer recent extinctions and have fewer currently endangered species, suggesting that species sensitive to human occupation became extinct, leaving only the more resilient species. The impact of humans appears superficially greatest in the most recently occupied areas, the implication being that places that have been occupied by humans for a long time have already lost most of their human-sensitive species.

### Extinction debt

If species in a community are linked through a food web or mutualistic relationships, the extinction of one may lead to the extinction of another (Gilbert 1980). Heywood *et al.* (1994) argue that predicted extinction rates are higher than those observed because of the time lag that exists before species that are “committed to extinction” are lost. Culotta (1994) and Tilman *et al.* (1994) predict that habitat destruction causes an “extinction debt” whereby extinction occurs generations after habitat fragmentation. This represents a future ecological cost as a result of current habitat destruction.

Magsalay *et al.* (1995) support this notion from work done on Cebu Island where only 0.3% of the original dipterocarp forest remains. They consider both Cebu Island’s endemic bird species (as well as five endemic sub-species) to be “committed to extinction”. In Puerto Rico, less than one percent of the original forest remains but to date, no bird species has become extinct (Brash 1987). Brash (*op. cit.*) states that extinction lag (debt) is possibly a factor contributing to the depressed avian extinction rate in Puerto Rico.

### Avian extinctions over the last 47 years

There have been 12 avian extinctions in the last 47 years (Table 25). This is the lowest extinction rate in the last 200 years. Of these extinctions, eight occurred on islands and three on continents. One species' range spanned both island and mainland. Habitat destruction and introduced predators were the most important causes of extinction accounting for six and five extinctions respectively.

The islands affected in the past 47 years were New Zealand (2), Hawaii (2), Fiji (1), Seychelles (1), Guam (1), and Pohnpei (1). For half these islands, these were the first avian extinctions (Fiji, Guam and Pohnpei). The most recent extinction is the Ivory-billed Woodpecker in 1991, which had a range spanning Cuba and the southeastern USA. The Seychelles has experienced the most recent island extinction (1986), followed by Guam (1985), Fiji (1973) and New Zealand (1965). Five of the eight island extinctions were caused by introduced predators.

**Table 25. The chronology and cause of avian extinctions since 1950.** (HD - habitat destruction, Ex - exploitation, IP - introduced predators, M - mainland, I - island, B - island and mainland.)

Species	Cause	Habitat	Date	Source
Glaucous Macaw	HD	M	1955	Mountfort (1988)
Piopio*	IP	I	1955	Fuller (1987)
Pohnpei Mountain Starling*	?	I	1956	Mountfort (1988)
Akiola*	HD/O	I	1960	Collar <i>et al.</i> (1994)
Kakawihie*	HD/O	I	1963	Collar <i>et al.</i> (1994)
Bush Wren*	IP	I	1965	Collar <i>et al.</i> (1994)
Barred-wing Rail	IP	I	1973	Collar <i>et al.</i> (1994)
Colombian Grebe	HD	M	1977	Collar <i>et al.</i> (1994)
Guam Flycatcher*	IP	I	1985	Collar <i>et al.</i> (1994)
Aldabra Warbler*	IP	I	1986	Collar <i>et al.</i> (1994)
Atitlan Grebe	HD	M	1987	Collar <i>et al.</i> (1994)
Ivory-billed Woodpecker	HD,Ex	B	1991	Collar <i>et al.</i> (1994)

(\* indicates passerine species)

The three mainland extinctions occurred in countries of Central and South America, the most recent being in Guatemala (Atitlan Grebe *Podilymbus gigas*). The habitat of the

Glaucous Macaw was spread over four countries. Habitat destruction was the cause of all mainland extinctions in this time frame.

Seven extinctions were of passerines and five of non-passerines. All the passerine extinctions occurred on islands and all the mainland extinctions were non-passerine. Introduced predators were the main cause of extinction of the passerine species affected (four out of seven) and habitat destruction was responsible for all the non-passerines extinctions except one, the Barred-winged Rail *Nesoclopeus poeciloptera* of Fiji. This is the only island-dwelling non-passerine that has become extinct recently.

### Body size

The mass range of extinct species in this analysis was between 3g and an estimated 500 kg with a median of 334 g. However, species with body masses less than 200 g accounted for 73 (60%) of the 126 extinct species whose mass could be inferred. This suggests that small birds are particularly at risk. However, Gaston and Blackburn (1994) report that most bird species are small-bodied, with a median mass of 37,6 g.

Only one bird weighing over 2 000 g has become extinct in the last 150 years. This is probably because large, vulnerable birds had already become extinct (before 1800). It is also thought that bigger birds will be more susceptible to extinction through habitat destruction as they need larger ranges to survive (Brown and Brown 1992). This is not reflected in the extinction record where, of causes known with certainty, the majority of larger bird extinctions were as a result of exploitation for food. Although habitat destruction is thought to have played a role in the moa, emu and Elephant Bird extinctions, its isolated effect cannot be evaluated. The effect of ongoing habitat loss and fragmentation on larger species should become evident in the next 20 years or less (Simberloff 1984, Pimm 1995).

The extinction of smaller species became more frequent post-1800, this again being coincident with the European colonial expansion and its associated extinction pressures (p. 49). All the extinction causes affected these species. Several studies concur with the hypothesis that for a given population size, small bodied species are more vulnerable than larger-bodied species (Peters and Realson 1984, Belovsky 1987, Pimm *et al.* 1988, Soulé *et al.* 1988, Gotelli and Graves 1990, Tracey and George 1992): this may be particularly true when population size is small (Pimm *et al.* 1988). However, even although more small-bodied species have become extinct than large-bodied ones, this may simply be because there are proportionally more small bird species than large ones (Gaston and Blackburn 1994).

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## Chapter Three: Threatened avifauna.

### Part 1 - Results

Collar *et al.* (1994) identify 1111 bird species that are globally threatened. Of these, 482 species exclusively inhabit islands, 587 exclusively inhabit mainland regions and 42 inhabit both mainland and island habitats. Threatened species are placed into one of four categories: extinct in the wild, critically threatened, endangered or vulnerable. In this analysis, the four “extinct in the wild” species are grouped with those in the “critical” category, making 172 species that are critically threatened. Two hundred and thirty five species are endangered and 704 are vulnerable.

### Causes of threat

#### *All threatened species*

The causes of threat as listed by Collar *et al.* (1994) have been categorized in the same way as the main causes of extinction: *viz.* habitat destruction, introduced vertebrates and exploitation. There are also “other” and “unknown” causes (Table 26). The category of introduced vertebrates differs from that of introduced predators as used in Chapter 2 for reasons discussed in the “methods” section (Part 2 of Chapter One).

Habitat destruction as a sole cause or in combination with other threat causes affects 760 species of bird. As the sole cause it affects almost half of all the threatened species in the world. Proportionally, many more mainland species (60%) than island species (37%) are threatened by habitat destruction. A combination of habitat destruction and exploitation threatens the next highest number of species, and together these two sources of threat affect almost two-thirds of the species listed by Collar *et al.* (1994).

Table 26. Distribution of threat types amongst bird species inhabiting islands and mainlands

Key:

H.D. Habitat destruction  
 Ex Exploitation  
 I.V. Introduced vertebrates

Numbers:

	Island		Mainland		Both		Total	
	(#)	(%)	(#)	(%)	(#)	(%)	(#)	(%)
HD	180	37	351	60	9	21	540	48
Ex	14	3	7	1	11	26	32	3
IV	49	10	8	1	0	0	57	6
HD/Ex	74	15	89	15	9	21	172	15
HD/IV	31	6	14	2	3	7	48	4
IV/Ex	5	1	0	0	3	7	8	1
Other	69	14	49	8	6	14	124	11
Unknown	60	12	69	12	1	2	130	12
Total	482		587		42		1111	

Habitat destruction and exploitation in conjunction threaten 172 species of which 89 are mainland species. These two factors affect 15% of threatened mainland species and 21% of the threatened species whose ranges include both mainland and islands. Species found in both mainland regions and on islands are affected most by exploitation (26%). Habitat destruction alone affects 21% of these species.

“Other” causes threaten 124 species. These vary from drowning on tuna longlines (Wandering Albatross *Diomedea exulans*) to genetic swamping and fire (Black-eared Miner *Manorina melanotis*). Of the remaining known threat factors, introduced vertebrates threaten 6% of threatened species, habitat destruction and introduced vertebrates 4%, exploitation 3% and introduced vertebrates and exploitation 1%. Unknown causes threaten 130 species; 60 of these species live exclusively on islands and 69 exclusively in mainland regions and one species inhabits both.

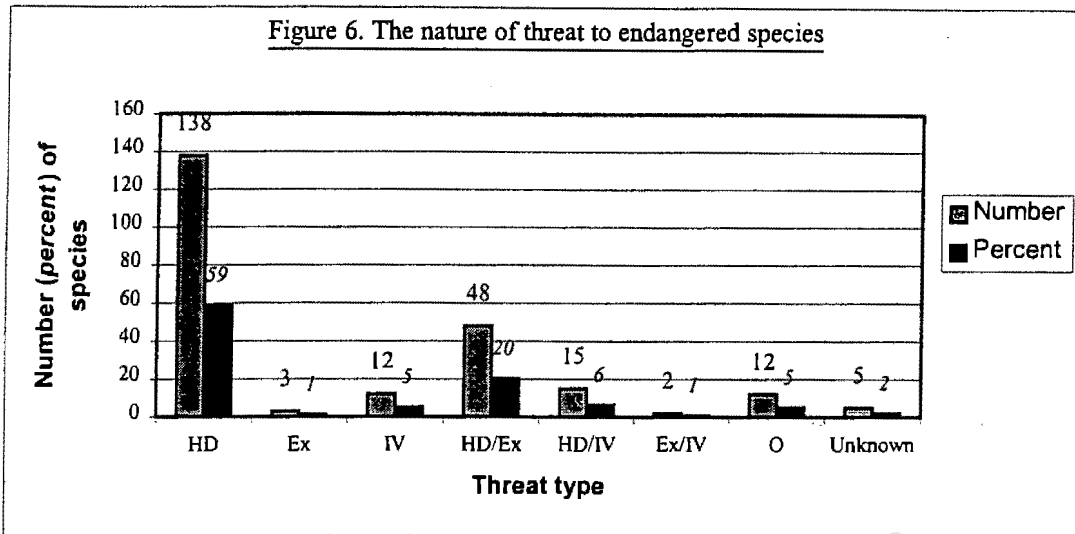
### *Endangered species*

A detailed analysis of the 403 endangered and critically threatened species was carried out. In 271 cases, the major threat factor (habitat destruction, introduced vertebrates, exploitation, other or unknown) appeared together with one or both of two other threats listed by Collar *et al.* (1994) *viz.* natural causes (exacerbated by other causes) and small ranges or populations. One hundred and eighteen of the 235 endangered species and 153 of the 168 critical species were affected in this way. Excluding those affected by natural causes, 233 species are affected: 96 endangered species and 137 critically threatened species. Balmford and Long (1994) showed that of all threatened bird species, nearly 80% have breeding ranges less than 50 000 km<sup>2</sup> in extent.

Only the main threat factors are discussed below but cognizance needs to be taken in considering the proportion of species that are also affected by natural causes and/or have small ranges or populations.

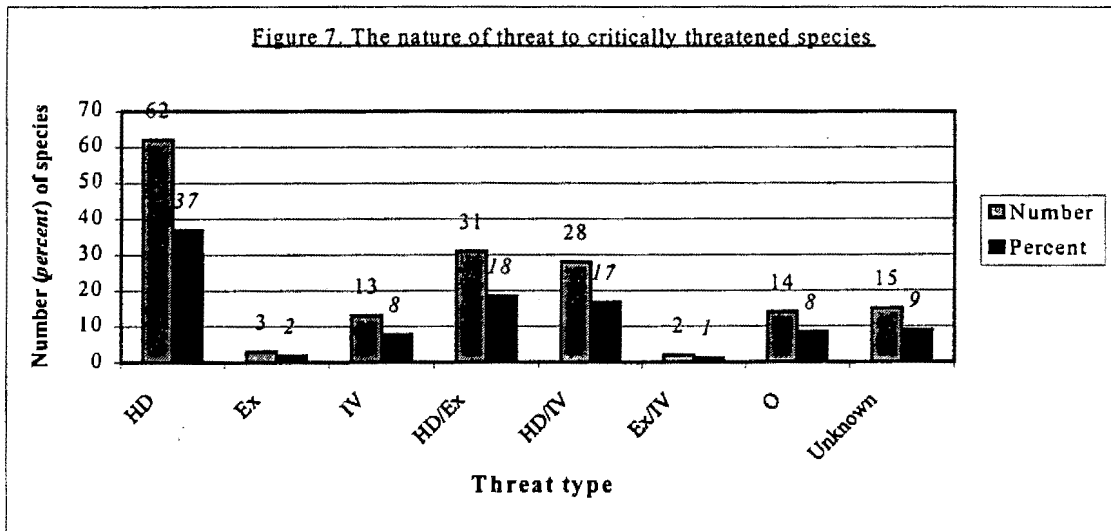
Habitat destruction alone affects 138 (59%) endangered species (Fig. 6); habitat destruction and exploitation combined affect a further 48 species (20%). These two threat types account for 79% of threat to endangered birds. Habitat destruction coupled with introduced vertebrates affects 15 species. Habitat destruction is therefore implicated in the poor conservation status of 86% of all endangered species.

Introduced vertebrates alone, and causes classified as "other" each threaten 12 species. There are five species for which the threat is unknown.



*Critical species*

Sixty-two critical species (37%) are threatened primarily or exclusively by habitat destruction (Fig. 7). Combinations of habitat destruction and exploitation, and habitat destruction and introduced vertebrates are the next major sources of threat, affecting 31 (18%) and 28 (17%) species respectively. Thus, habitat destruction contributes to the critical status of 72% of critically threatened species worldwide. Fourteen species are threatened by the “other” causes mentioned earlier. Introduced vertebrates affect 13 species. Eighty-two percent of critical species have small ranges and/or populations. The threats to 15 species (9%) are unknown.



## Geography of threat

### *All threatened species*

Figures 8a+b compare the numbers and percentages of extinct and threatened species as a function of their distribution (mainland, island or both). Forty-nine percent of critically threatened species are found exclusively in mainland habitats. Forty-eight percent occur on islands only, and 2% inhabit both. In each threat category there are more species threatened in mainland habitats than on islands with the exception of critical species.

A summary of threat in the 25 most affected countries is presented by Collar *et al.* (1994). Asian countries contain the most threatened species (600) followed by South American countries (376). Specifically, Indonesia and Brazil have the greatest number of threatened species, 104 and 103 respectively, followed by the Philippines and China, both with 86.

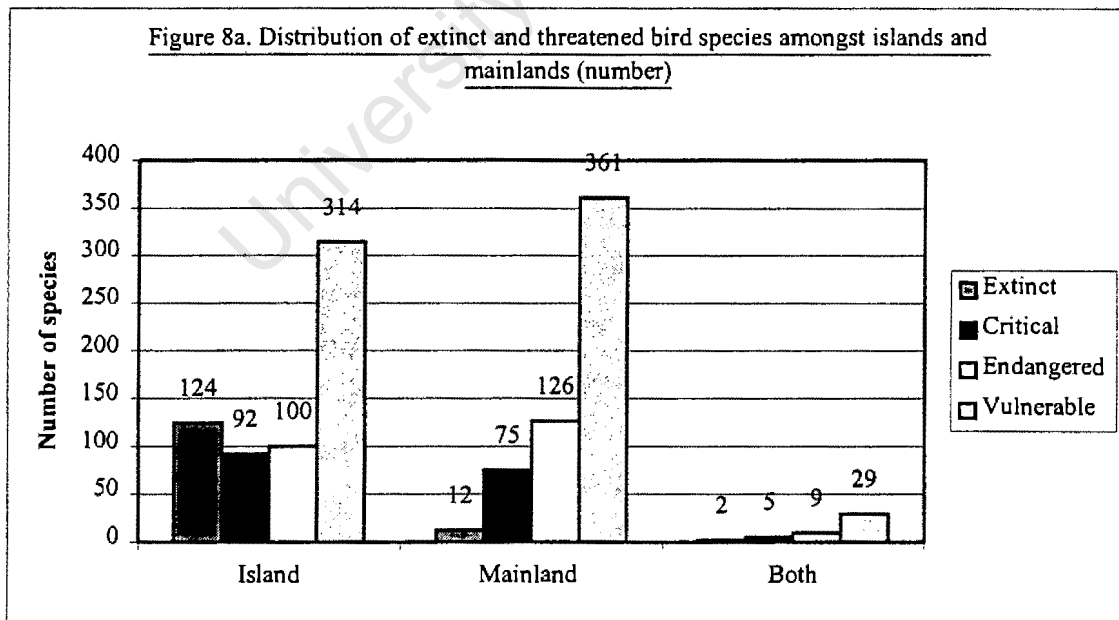
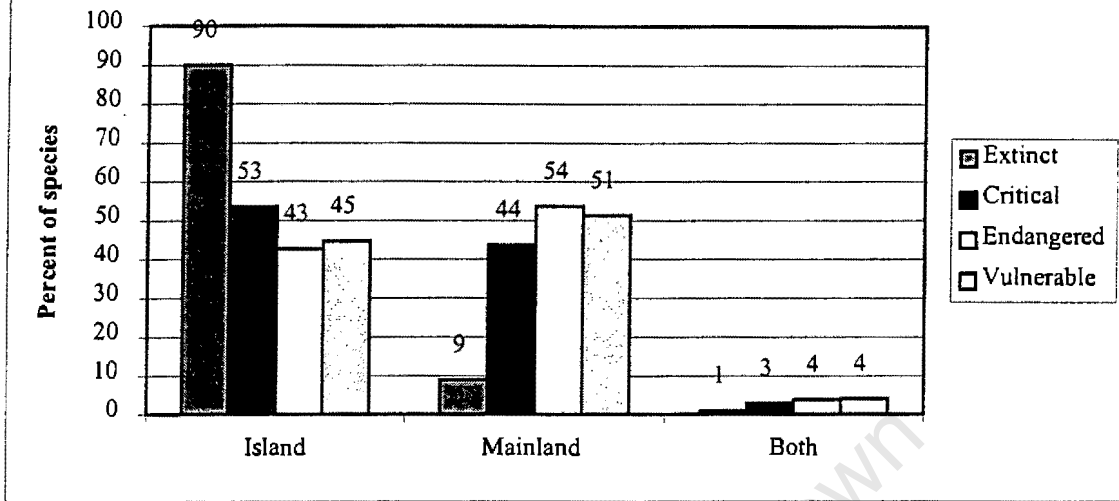


Figure 8b. Distribution of extinct and threatened bird species amongst islands and mainlands (percent)



Of endangered and critically threatened species, 264 (64%) occur on the mainland and 146 on islands (Table 27). South America has 159 species and Asia 145. (A larger proportion of species are vulnerable in the Asian region (86%) than in South America (48%) - Collar *et al.* (1994)). Forty-seven endangered and critically threatened species occur in Brazil and 45 in the Philippines. Colombia follows with 31 species; Mexico and Indonesia each have 20 species in these threat categories.

Table 27. Geographical distribution of threat in the 25 countries with the largest number of threatened species (not divided into regions).

<i>All categories (vulnerable, endangered and critical)</i>	Number of threatened species	<i>Endangered and Critical species</i>		<i>Threatened endemics</i>		
		Country	Number of threatened species	Country	Number of threatened species	Percentage of threatened species that are endemic
Indonesia	104	Brazil	47	Philippines	40	89
Brazil	103	Philippines	45	Brazil	32	68
Philippines	86	Colombia	31	Colombia	24	77
China	86	USA	25	USA	17	68
India	71	Indonesia	20	Indonesia	12	60
Colombia	62	Mexico	20	New Zealand	12	92
Peru	60	Peru	18	Australia	11	92
Ecuador	50	Ecuador	16	Madagascar	10	100
USA	46	Argentina	16	Peru	9	50
New Zealand	45	Vietnam	16	Venezuela	7	64
Vietnam	45	China	13	Ecuador	6	38
Australia	44	India	13	Cuba	6	60
Thailand	44	New Zealand	13	Angola	5	83
Myanmar	43	Australia	12	Kenya	5	100
Argentina	40	Venezuela	11	Somalia	5	100
Russia	35	Thailand	11	Vietnam	5	31
Mexico	34	Japan	11	Ethiopia	4	100
Japan	31	Madagascar	10	India	4	31
Malaysia	31	Paraguay	10	Seychelles	4	100
Papau New Guinea	31	Cuba	10	New Caledonia	4	100
Tanzania	30	Solomon Islands	9	Micronesia	4	100
Bangladesh	28	French Polynesia	9	Comoros	4	100
Madagascar	28	Malaysia	8	Mexico	3	16
Bolivia	27	Myanmar	8			
Zaire	26	Bolivia	8			

### *Endangered species*

Nine South American countries contain a total of 73 endangered species (Table 28, Fig. 9). These species are spread over most of South America except for the southern part of the continent. Brazil and Colombia are most affected with 19 and 17 species respectively. Forty-nine of the 79 species are endemic to one country. Twenty-three species are found in two countries and 10 species in three countries.

There are 70 endangered species in Asia, 15 of which are mainland species. The Philippines has the highest number of endangered species with 26, more than one third of the endangered species in the region. Indonesia has the next most endangered species (10).

Africa has 31 endangered species, the country with the most endangered species being Angola with 6. There are nine endangered species on "African" islands, five of which are on Madagascar. There are two regions where there are a disproportionately large number of endangered species, east central Africa and the western parts of southern Africa. This is seen in Figure 10, which shows the global density of endangered birds.

Central American countries and islands contain the next highest number of endangered species (26), 14 of these occurring in Mexico. Eleven species inhabit islands, six being found on Cuba.

Australia and New Zealand have 19 endangered species, ten in Australia, eight in New Zealand and one that is found in both countries. There are a further five species that are threatened on islands in the south Pacific around Australia and New Zealand. In this region there are more species endangered on islands than in mainland regions, Asia being the only other region where the bias is skewed toward island species.

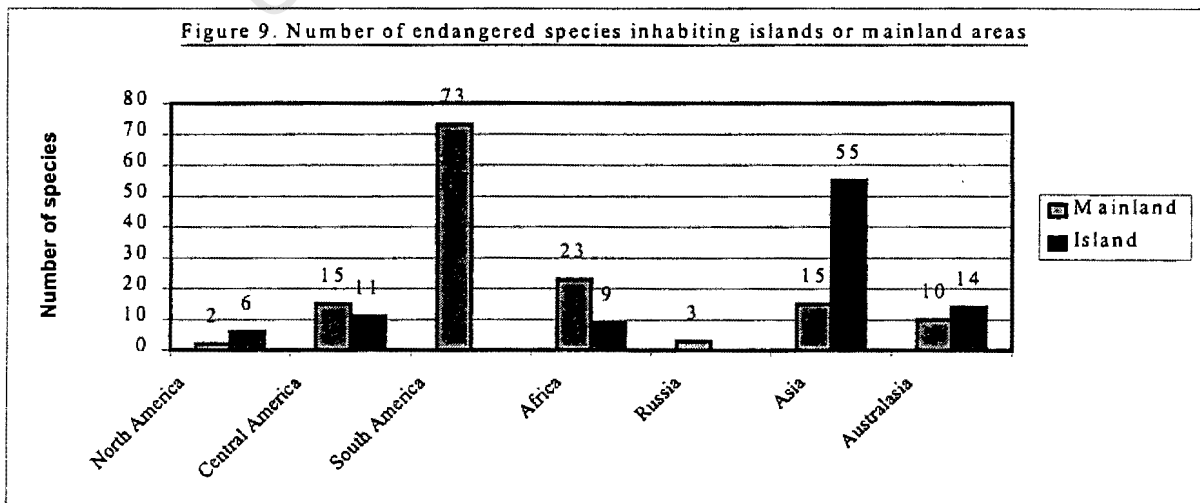
Europe is the only continental region that has no globally endangered species.

Table 28. Geographical distribution of endangered species

Region		Country	Number of endangered bird species	Totals		
South America		Bolivia (BO)	3	73		
	Key: AR - Argentina	Brazil (BR)	19			
	PY - Paraguay	Colombia (CO)	17			
	CL - Chile	Ecuador (EC)	3			
		Peru (PE)	4			
		Venezuela (VE)	3			
		AR, BR, PY	9			
		AR, BR	1			
		BO, BR	1			
		BO, PE	2			
		CO, EC	2			
		CO, VE	2			
		EC, PE	5			
		PE, CL	1			
		CO, EC, VE	1			
	Central America	Mainland	Mexico		14	26
Guatemala			1			
Islands		Bermuda	1			
		Cuba	6			
		Dominican Rep. and Haiti	1			
		Martinique	1			
		St. Lucia and Martinique	1			
		Puerto Rico	1			
		North America	Canada	1	8	
			U.S.A. (Mainland)	1		
(Hawaii)	6					
Asia	Mainland	China	2	70		
		Vietnam	2			
		India (and Bangladesh)	4			
		More than one country	7			
	Islands	French Polynesia	6			
		Indonesia	10			
		Japan	2			
		Micronesia	3			
		Philippines	26			
		Solomon Islands	1			
		Papua New Guinea and Solomon Islands	5			
		Sri Lanka	2			

Table 28 (cont.)

Russia		Russia	2	3
		Russia and China	1	
Africa	Mainland	Algeria	1	31
Key: CI - Ivory Coast		Angola	6	
GH - Ghana		Ethiopia (ET)	4	
ZA - South Africa		Kenya (KE)	1	
ZM - Zambia		Tanzania	1	
MW - Malawi		Somalia	4	
SD - Sudan		Zimbabwe (ZW)	1	
		CI, GH, GN	2	
		ET, ZA, ZM	1	
		MW, ZA, KE, SD	1	
	Islands	Cape Verde	1	
		Madagascar	5	
		Mauritius	1	
		Réunion	1	
		St. Helena	1	
Australia			10	10
Australia and N.Z			1	1
New Zealand and surrounding islands		New Zealand	8	13
		New Caledonia	3	
		Fiji	1	
		Togo	1	
			235	235



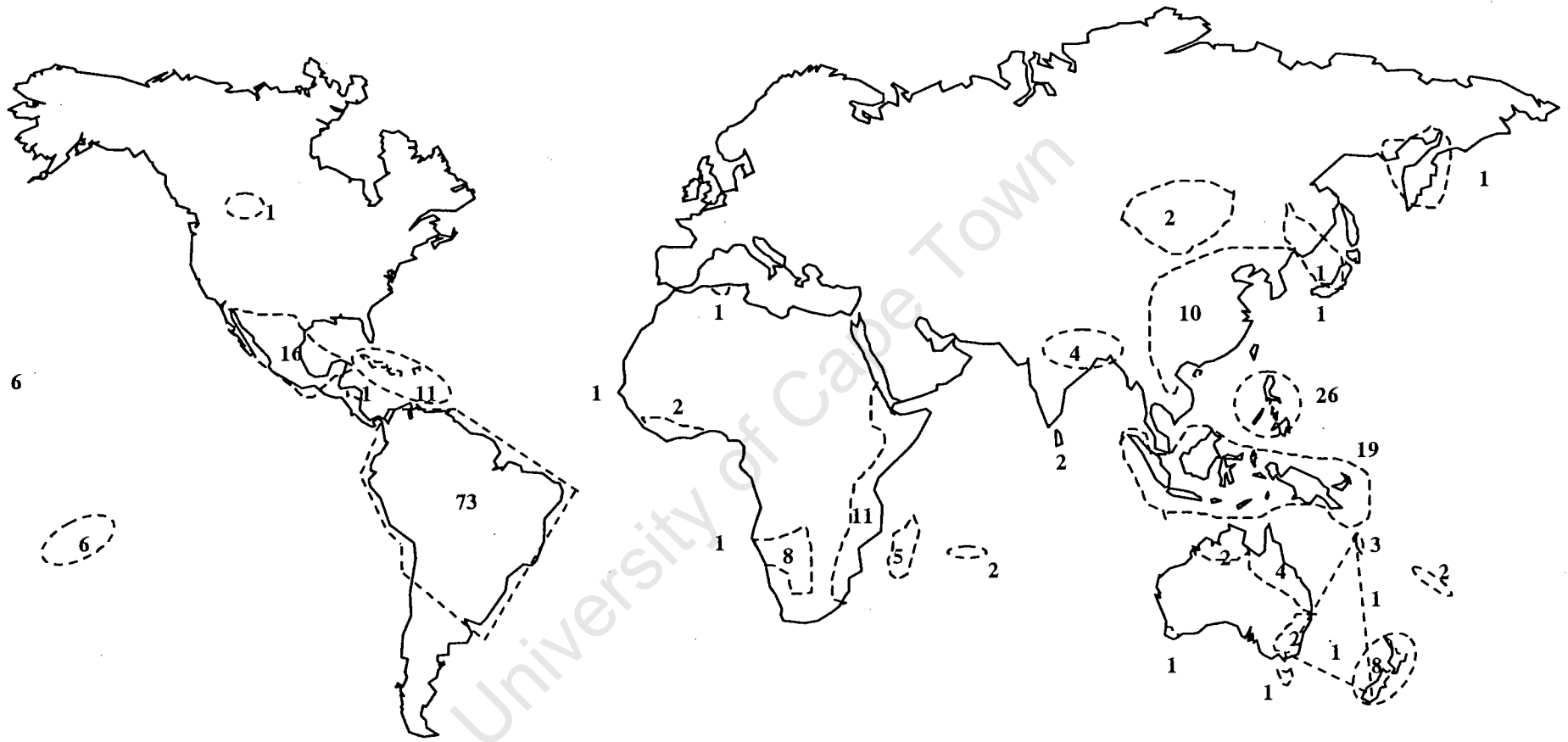


Figure 10. Distribution of endangered avifauna

### *Critically threatened species*

South America has the highest number of critically threatened species with 42 (Table 29, Fig. 11). Asia and Africa are the next two most affected regions, with 41 and 37 critically threatened species respectively.

In South America, the 42 critical species are distributed in 11 countries and all are mainland species (Fig. 11). Brazil has 14 critical species, followed by Colombia with eight. Four species inhabit more than one country. There are 38 species endemic to eight respective countries.

Asia has 18 countries and islands that collectively hold 41 critical species. Mainland countries hold 14 species, of which China and Vietnam have four each. India and Nepal together share three critical species. Three species inhabit several countries; these are included as “other” in Table 31. Eight islands or island chains hold 27 critical species, 14 being found in the Philippines (Figure 12).

The 37 critically threatened African species are distributed amongst ten mainland countries and eight islands. Islands hold 68% of these species. There are 12 species that are critical in the ten mainland countries. Of the mainland countries, only Kenya has more than one species, with four. Some species' ranges extend over more than one country. The most affected region of mainland Africa is along the east coast where there are seven critical species. There are 25 critical species on eight islands/island groups. Madagascar and Mauritius each have five species and the Seychelles four.

Central American countries and islands have 15 critically threatened species. Mexico has the highest number with five followed by Jamaica with three. There are nine species that inhabit islands and six with mainland ranges.

Table 29. Geographical distribution of critically threatened species

Region		Country	Numbers	Totals
South America ( Codes for South American countries are as in Table 28).		Argentina	1	42
		Bolivia	1	
		Brazil	14	
		Chile	1	
		Colombia	8	
		Ecuador	4	
		Paraguay	0	
		Peru	5	
		Venezuela	4	
		AR,BR,PY	2	
		AR,CL	1	
		CO,EC	1	
Central America	Mainland	Mexico	5	16
		Honduras	1	
	Islands	Cuba	2	
		Jamaica	3	
		St. Lucia	1	
		Puerto Rico	2	
		Trinidad and Tobago	1	
		Granada	1	
North America		Canada and U.S.A.	1	13
		U.S.A. (Mainland)	2	
		(Hawaii)	10	
Asia	Mainland	China	4	45
		Vietnam	4	
		Other	4	
		India	3	
	Islands	Guam and N'mn Marianas	4	
		Indonesia	2	
		Japan	2	
		Micronesia	1	
		Philippines	14	
		Solomon Islands	2	
		Papau New Guinea and Solomon Islands	2	
		French Polynesia	2	
Russia		1	1	

Table 29 (cont.)

Africa	Continent	Algeria	1	38
		Cameroon	1	
		Djibouti	1	
		Kenya	4	
		Liberia	1	
		Mozambique and Tanzania	1	
		Nigeria	1	
		Somalia	1	
		South Africa	1	
		Islands	Comoros	
	Madagascar		5	
	Mauritius		5	
	Mayotte		1	
	Réunion		2	
	Sao Tome and Príncipe		3	
	Seychelles		4	
	St. Helena		1	
	Madeira		1	
	Amsterdam Island		1	
	Australia		2	
New Zealand and surrounding islands	New Zealand	4	11	
	Fiji	2		
	Norfolk Island	2		
	Cook Island	1		
	Western Samoa	2		

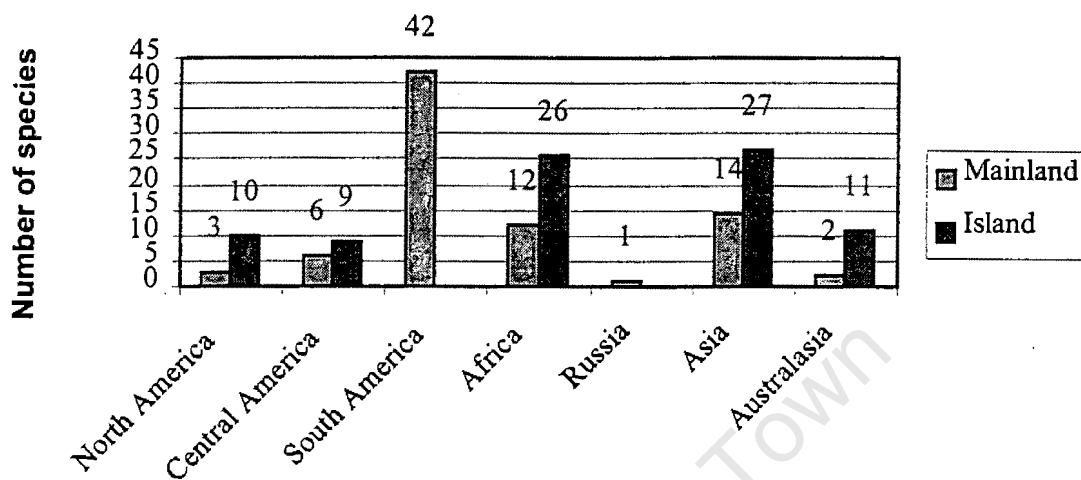
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168

Extinct in the wild

NE Brazil	(Alagoas Curassow)	1
Guam	(Guam Rail)	1
Revillagigedo Is. (Mexico)	(Socorro Dove)	1
New Zealand	(Kakapo)	1
		<u>4</u>

Figure 11. The number of critically threatened species inhabiting islands or mainland areas



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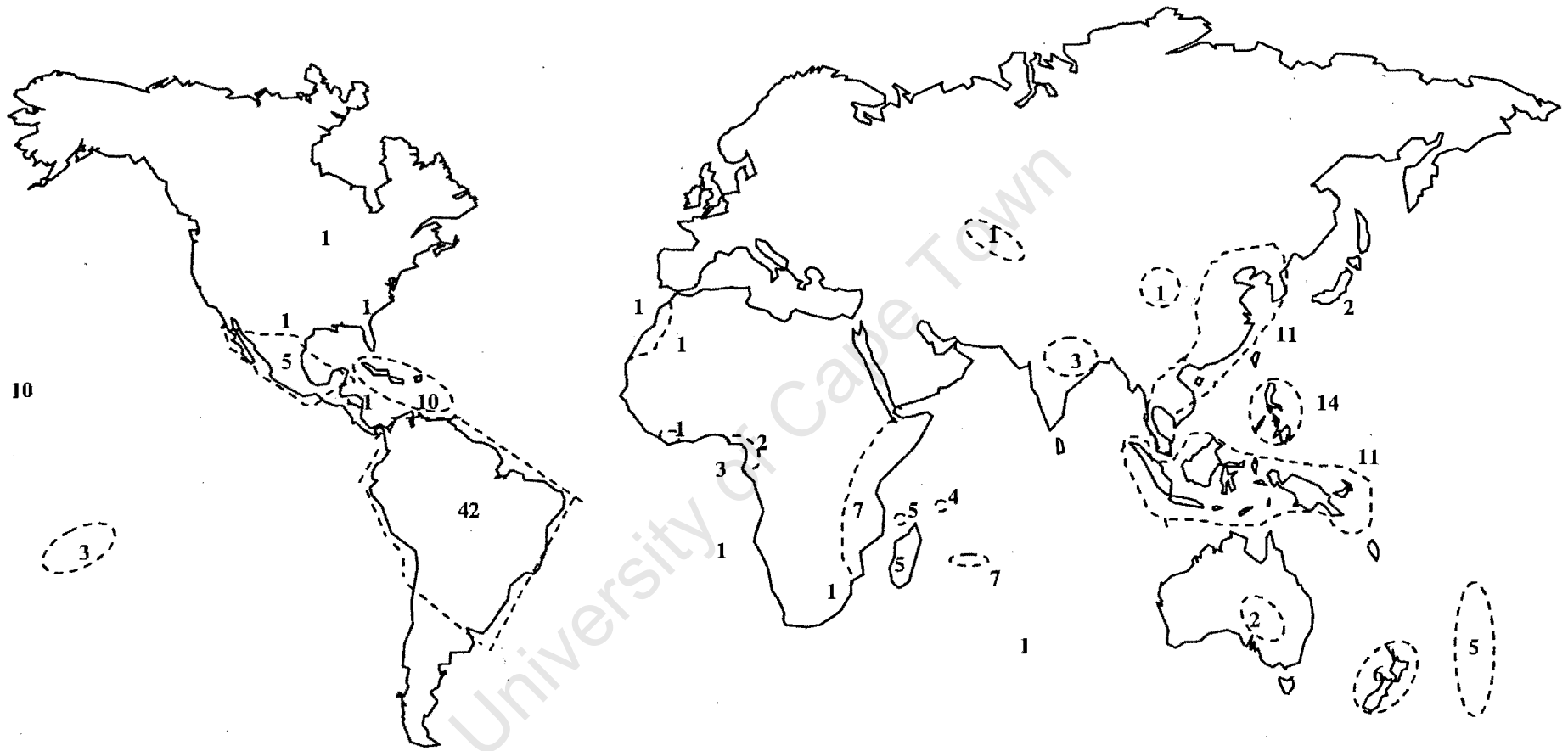


Figure 12. Global distribution of critically threatened avifauna

North American countries have 13 critical species: one species inhabits both Canada and the USA, the remainder being restricted to the USA. The North American continent, however, contains only three critical species as the remaining ten occur on the Hawaiian islands.

In the Australian region, there are 11 species critically threatened on islands and two on the Australian mainland. New Zealand and the immediate area around it, including Norfolk Island, contains six critically threatened bird species.

Russia has one critically threatened species, the Slender-billed Curlew *Numenius tenuirostris*.

Table 29 also lists the names of those birds classified as “extinct in the wild” and the country in which they are found. Three islands and one mainland country are affected.

### Taxonomy

Monroe and Sibley (1993) and Collar *et al.* (1994) do not follow identical classifications. Adopting a particular classification influences measures of degrees of threat at the family level. For threatened species I have adopted Collar *et al.*'s (1994) classification and indicate where these classifications differ at the family level (Table 32). For numbers of extant species in families I follow Monroe and Sibley (1993). Where Monroe and Sibley (1993) and Collar *et al.* (1994) differ on the family/sub-family level this is indicated in Table 30 and is explained.

### *All threatened species*

One hundred and forty five avian families hold the approximately 9700 bird species in the world (Monroe and Sibley 1993). The sizes of these families range from 1 species (Struthionidae) to 824 species (Emberizidae). Collar *et al.* (1994) list 102 families and 14 sub-families that contain threatened species. Numbers of threatened species within

families range from a single species (e.g. Hydrobatidae and Sulidae) to the Psittacidae where 88 (24%) of the 349 species are threatened.

A correlation between family size and the number of threatened species in them, using all the extant families, including those which did not have threatened species in them, indicated no relationship between family size and the number of threatened species in it. ( $r_{204} = -0.06$ ).

Table 30 lists families in which 20% or more of species are threatened. Three hundred and sixty three species are contained in these families. Five families have all of their species threatened; all of these are families containing between one and three species. The Drepanididae, a larger family, has almost 80% of its species threatened. This is followed by the (smaller families) Casuariidae, Picarthartidae, Callaeidae and Orthonychidae, each with 50% of the family threatened. These families have only two or four extant species in them.

Among families with threatened taxa, 16 (40%) contain having fewer than ten species: these include 26 threatened species. Eight of the 39 families in Table 30 are relatively large, having more than 50 extant species. These eight families together account for 257 of the threatened species, almost one quarter of the global total.

Table 30. Status of families which have over 20% of their species threatened

Family	Number of species threatened	Number of extant species	Percent threatened	Percent extinct
Casuariidae	2	4	50	0
Apterygidae	3	3	100	0
Spheniscidae	5	17	29	0
Diomedidae	3	14	21	0
Procellariidae	23	79	29	1
Pelecanoididae	1	4	25	0
Pelecanidae	2	9	22	0
Phalacrocoracidae	8	36	22	2
Fregatidae	2	5	40	0
Ciconiidae	5	26	20	4
Threskiornithidae	7	33	21	5
Phoenicopteridae	2	5	40	0
Cracidae	15	50	30	0
Phasianidae	48	175	27	1
Megapodiidae	8	19	42	0
Mesitornithidae	3	3	100	0
Trogonidae	5	16	31	0
Rallidae	32	132	24	10
Heliornithidae	1	4	25	0
Pedionomidae	1	1	100	0
Gruidae	7	15	47	0
Rhynchoetidae	1	1	100	0
Psittacidae	88	349	25	5
Tytonidae	5	17	29	6
Coraciidae	4	12	33	0
Capitonidae	3	14	21	0
Pittidae	7	31	23	0
Philepittidae	1	4	25	0
Cotingidae <sup>†</sup>	15	69	22	0
Atrichornithidae <sup>†</sup>	2	2	100	0
Picathartidae	2	4	50	0
Zosteropidae	21	93	22	2
Drepanididae <sup>†</sup>	16	21	76	33
Callaeidae	1	2	50	33
Orthonychidae	1	2	50	0
Laniidae	1	30	35	0
Cinclidae	1	5	20	0
Totals	363	1332		

<sup>†</sup> Monroe and Sibley (1993) classify these below the family level whereas Clements (1991) and Collar *et al.* (1994) list them as families. Column three uses figures for sub-families or tribes as listed by Monroe and Sibley (1993) that best reflect the grouping used by Collar *et al.* (1994).

*Endangered and critical species*

Eighty-three families contain one or more endangered or critically threatened species. Of these, 25 families have five or more endangered and critical species in them (Table 31). One hundred and fourteen of the 168 critical species (68%) and 155 of the 235 endangered species (66%) are contained in these families. Thus, approximately one-third of all families with endangered and critical species in them hold 67% of the total endangered and critical species complement.

Table 31. Status of families with five or more endangered and critical species

Family	Critical	Endangered	Number of extant species	Percent endangered and critical species
Procellariidae	9	4	78	16
Ciconiidae	5	1	26	23
Anatidae	4	2	129	4
Accipitridae	3	6	251	4
Cracidae	5	3	50	16
Phasianidae	8	6	175	8
Rallidae	6	10	132	12
Columbidae	13	9	310	7
Psittacidae	10	26	349	10
Strigidae	4	4	155	5
Trochilidae	8	7	322	4
Furnariidae <sup>†</sup>	3	4	279	3
Formicariidae	2	8	244	4
Tyrannidae <sup>†</sup>		6	539	1
Alaudidae	1	4	91	5
Turdidae <sup>†</sup>	6	6	176	6
Timaliidae <sup>†</sup>	1	5	236	2
Muscicapidae <sup>†</sup>	1	6	117	6
Monarchidae <sup>†</sup>	4	6	138	10
Zosteropidae	7	1	93	8
Emberizidae*	4	14	612	3
Drepanididae <sup>†</sup>	4	6	21	48
Icteridae <sup>†</sup>	1	6	97	7
Fringillidae <sup>†</sup>	1	4	170	3
Parulidae <sup>†</sup>	4	1	116	4
Totals	114	155	4906	

<sup>†</sup> These taxa are listed at a sub-family level by Monroe and Sibley (1993) but at the family level by Collar *et al.* (1994) and Clements (1991).

\* Monroe and Sibley (1993) include in this family what Clements (1991) and Collar *et al.* (1994) consider families (Emberizidae, Icteridae and Parulidae) and list 824 species. This table follows the latter's classification.

The Psittacidae have the highest number of species in these categories (36) followed by the Columbidae (22) and the Emberizidae (18). These families contain a relatively large number of species; 360, 313 and 612 respectively. Families with the highest proportion of endangered and critical species are the Drepanididae (48%), Ciconiidae (23%) and Cracidae (16%). These families contain fewer taxa: 21, 26 and 50 species respectively.

There is a negative correlation between the size of a family and the proportion of endangered or critical species within it ( $r_{25} = -0.36$ ,  $p < 0.05$ ). Families that are smaller tend to face a higher degree of threat.

### Endemicity

There are 81 endemic species in six South American countries, 61 in four Asian countries, 23 in Australasia and 19 in Africa (Collar *et al.* 1994). Of the 86 endangered and critical species endemic to islands, 40 are endemic to the Philippines and 12 each to Indonesia and New Zealand.

The country with the greatest number of endangered and critical endemic species is the Philippines with 40, accounting for two-thirds of the endangered endemics in the Asian region. The next two most affected countries are Brazil (32) and Colombia (24).

Seven countries have only endemic birds that are endangered or critical, the number of species affected being either four or five. Of these countries four are islands. Ninety-two percent of New Zealand's and Australia's endangered and critical species are endemics. In the Philippines this figure stands at 89% and in Brazil and Colombia it is 68% and 77% respectively.

### Habitat of threatened birds

Avian species that live in forests are under greater threat than species that live in other habitats. Over half of the threatened birds of the world (632 species, 56.9%) live exclusively in forests. When considering birds that inhabit forests as well as some other habitat, 74.6% of all threatened birds are affected (709 species) (Collar *et al.* 1994).

Comparing the habitat requirements of vulnerable, endangered and critically threatened species shows that the same percentage of birds that are vulnerable and endangered inhabit forests (55.7%). Almost 80% of endangered species live in forests or both forests and some other habitat. Of the critically threatened species 63.4% inhabit forests only and over three quarters inhabit forest or both forest and some other habitat.

Of the other habitats that hold a higher proportion of the remaining threatened birds, scrub, wetlands and grasslands are most important. Scrub holds 9.3% of threatened species, wetlands 8.8% and grassland 6.3%.

### Body size, endemism, threat and extinction on ten selected islands

Ten islands of various sizes accounting for a range in the diversity of endemic avifauna were selected to test whether a relationship existed between body size, endemism, threat and extinction. This excluded island groups and archipelagos but did include individual islands found within these. Dunning (1993) does not list body masses for all the endemics on these islands so only endemics for which a body mass was available or could be reasonably inferred were used.

Within the selected subset of islands, Madagascar and Jamaica hold the most diverse endemic avifaunas and are also the two largest islands, although Jamaica is only marginally larger than the island of Hawaii (which has fewer endemics - Table 32).

Molokai has no endemics. No other island has more than ten endemics and, of these, no particular sized island has suffered a disproportionately large number of endemic extinctions.

Table 32. Body mass of endemic species on ten selected islands

Island	Island size (km <sup>2</sup> )	Number of endemics	Body mass (g)					Total
			< 50	50 - 100	100 - 300	300 - 700	> 700	
Lord Howe	17	2	1			1		2
Rodrigues	104	2	2					2
Molokai	676	0						0
Chatham	960	6	2		2		1	5
Tahiti	1042	2	1			1		2
Mauritius	1865	7	4		2	1		7
Réunion	2510	6	2	2	1	1		6
Hawaii	10464	5	3			1		4
Jamaica	10991	25	13	2	5	2	1	23
Madagascar	594180	104	38	6	22	7	6	79
Total			66	10	32	14	7	130

Most endemics for which there was information on body size had masses of <50 g (51%) or between 100-300 g (26%). Body masses of critical and endangered endemics on the ten islands are found in Table 33. The island with the most critical and endangered species is Madagascar (9), followed by Mauritius (5) and the island of Hawaii (3). Two islands have no critical or endangered species, and three islands one such species.

Overall, twenty percent of the endemics on these islands are critical or endangered. Although the largest fall within the weight ranges <50 g and 100-300 g, the largest proportion of critical and endangered species have body masses >700 g (63%). Four of these birds are on Madagascar and one on Chatham Island.

Table 33. Critical and endangered endemics on ten selected islands

The "%" in the Total column indicates the percentage of all endemic avifauna on the island that are critical or endangered (for which body masses were available).

Island	Island size (km <sup>2</sup> )	Primary threat cause	Body size (g)					Total	
			< 50	50 - 100	100 - 300	300 - 700	> 700	#	%
Lord Howe	17	IP				1		1	50
Rodrigues	104	HD	1					1	50
Molokai	676	?						0	
Chatham	960	IP	1		1		1	3	60
Tahiti	1042	?						0	0
Mauritius	1865	HD	2		2	1		5	71
Réunion	2510	HD,Ex		1	1			2	33
Hawaii	10464	HD,O	2			1		3	75
Jamaica	10991	HD,Ex,IP			2			2	8
Madagascar	594180	HD	3		2		4	9	11
Total			9	1	8	3	5	26	20
Percent under threat			16	9	26	23	63	20	

Habitat destruction features as the primary threat on six islands affecting 22 endemics. Introduced predators feature on three islands and affect six species; exploitation on two islands, in combination with other factors, affects four species. Combinations of primary threats occur on only three islands, these being two large islands (Jamaica and Hawaii) and one smaller island (Réunion).

Three of the islands have experienced ten or more extinctions - Rodrigues, Mauritius and Hawaii (Table 34), but there is no correlation between the number of extinct species and island size. The other islands, with the exception of Réunion, have experienced four or less extinctions. Madagascar, Mauritius and Hawaii have the most critical and endangered species (Table 34). Hawaii and Mauritius are islands that have experienced a large number of extinctions and also have a high proportion of their endemic avifauna endangered or critically threatened.

Table 34. Numbers of extinct, extant endemic, threatened and resident bird species on selected islands

Island	Island size (km <sup>2</sup> )	Number of extant endemic species	Extinct species		Number of extant and extinct endemics	Critical and endangered endemics		Total number of resident species	Human population
			Cause	Number		Cause	Number		
Lord Howe	17	2	Ex,IP	3	5	IP	1	27	371
Rodrigues	104	2	Ex	10	12	HD	1	14	36115
Molokai	676	0	HD	2	2		0	37	6587
Chatham	960	6	HD,IP	4	10	IP	3	16	760
Tahiti	1042	2	IV	4	6		0	21	131309
Mauritius	1865	7	Ex	11	18	HD	5	25	1116923
Réunion	2510	6	Ex	9	15	HD,Ex	2	26	652857
Hawaii	10464	5	HD,O	12	17	HD,O	4	62	120317
Jamaica	10991	25	?	2	27	All 3	3		2555064
Madagascar	594180	105	HD,Ex	2	107	HD,Ex	9	201	13427758
Totals		140		59	219		28	429	

In analyses that excluded Madagascar (which is an order of magnitude larger and has an order of magnitude more endemics than any other island in Table 34), there are significant correlations between island size and the number of extinct and extant endemic species ( $r=0.86$ ,  $p<0.05$ ) and between island size and the number of resident species ( $r=0.89$ ,  $p<0.05$ ). These correlations are perhaps intuitive, as one would expect larger islands to have more endemics and more residents. There is also a statistically significant correlation between the proportion of extinct and critical and endangered endemic birds (of all extant and extinct endemics since 1600) and human population density ( $r=0.77$ ,  $p<0.05$ ). This lends support to the idea that anthropogenic effects may be the cause of many more extinctions (Diamond 1989, Milberg and Tyrberg 1993, Simberloff 1984, 1986a).

Extinction and primary threat causes have changed over time on six of the islands in Table 34. On two islands there has been a complete switch between extinction and threat cause, and on four islands a threat cause has been added or removed (however this may only be an artifact of changed perception of threat cause based on improved scientific observation). Two islands have no critical or endangered endemic birds. On Hawaii and Madagascar the historical extinction and current threat causes affecting endemic species are the same.

Small islands are characterized by single threat causes, and larger islands by multiple threat causes. Extinction was caused on the smaller islands by both multiple and single factors and on larger islands by multiple factors. For critical and endangered endemics, habitat destruction threatens 19 species, exploitation four and introduced predators four. A swing from exploitation as the primary extinction factor to habitat destruction as the primary threat factor on these islands is evident.

Considering bird body size, 30 and three extinct species fell into the size ranges <50 g and 100-300 g respectively (27% and 3%). Nineteen extinct species fell into the 50-100 g range (17%) and 11 into the 300-700 g range (10%) with 12 (11%) being >700 g. The highest proportion of extinct species were placed in the <50 g size range, different to critical and endangered species that had the highest proportion in the >700 g range. In terms of numbers of endemic species, however, both had a maximum in the <50 g range.

The ten islands were placed into size categories of <1 000 km<sup>2</sup>, 1 000-10 000 km<sup>2</sup> and >10 000 km<sup>2</sup> and bird body sizes of the endemic species into mass categories of <100 g and >100 g (Table 35). This was done for extinct, extant, critical and endangered avifauna for which masses were available or could be inferred.

**Table 35. Numbers and proportions of extinct, extant and critical and endangered endemic species on the ten selected islands in relation to their body masses. Proportions are of numbers in the column headings.**

Body mass (g)	Extant and extinct species (192 spp.)				Extinct species (56 spp.)				Critical and endangered species (26 spp.)			
	< 100		> 100		< 100		> 100		< 100		> 100	
	#	%	#	%	#	%	#	%	#	%	#	%
< 1 000	19	10	15	8	7	13	11	19	2	7	3	12
1 000 - 10 000	13	7	25	13	4	7	19	34	3	12	4	15
> 10 000	73	38	47	24	11	20	4	7	5	19	9	35
Totals	105	55	87	45	22	40	34	60	10	38	16	62

The largest proportion of critical and endangered endemic bird species are those with a body mass >100 g found on islands whose area is >10 000 km<sup>2</sup>. The largest proportions of extinct birds had body mass in the same range and were found on islands with a size range of 1 000 - 10 000 km<sup>2</sup>. The largest proportions of extinct and

extant endemics in both size ranges was on islands  $>10\,000\text{ km}^2$ ; this result is due largely to the higher number of endemics found on Madagascar. On Hawaii and Madagascar (islands of  $>10\,000\text{ km}^2$  which support endemic avian species in both mass ranges - Table 33), the proportion of critical and endangered endemics is lower by almost half the proportion of species that has become extinct since 1600.

The number of critical and endangered endemic species in Table 35 is very much less than the number of species that have become extinct since 1600. There are two exceptions: endemic birds on islands with areas between  $1\,000$  and  $10\,000\text{ km}^2$  whose mass is  $<100\text{ g}$ , and endemic birds on islands  $>10\,000\text{ km}^2$  with body masses of  $>100\text{ g}$ . In the former category, although numbers are similar, the proportion of endemic species which are critical and endangered is almost double that of species that have become extinct. In the latter category, the number of critical and endangered endemic species affected is double that of extinct avifauna. The proportion of critical and endangered endemic bird species is five times that of avifauna that have become extinct on these islands since 1600.

In terms of extinct and extant species, the three islands in the size range  $>10\,000\text{ km}^2$  had more small birds become extinct since 1600 than are currently threatened: of birds  $<100\text{ g}$ , 11% became extinct whereas currently 4% are critical or endangered. There is, however, a higher proportion of large birds currently threatened on these islands than became extinct since 1600: 9% of birds  $>100\text{ g}$  are critical or endangered whereas 3% of birds in this range have become extinct since 1600. Perhaps this is an indication of the effect of habitat destruction (a threat on all three islands) on larger species, which need larger habitat ranges to survive.

On islands of  $<10\,000\text{ km}^2$ , the lower proportions of critical and endangered species compared with those of islands of area  $>10\,000\text{ km}^2$  (Table 36) are as a result of the large proportion of extinct species making up the total extinct/extant endemic avifauna complement (41 of 72 species - 57%).

The proportion of extinct and extant endemic bird species on these ten islands that are critical and endangered is generally much lower than the proportions of birds that have become extinct (Table 36). Extinct species (in both mass categories) made up 30% of 192 species that formed the historical species complement and critical and endangered species 12%. The largest proportions of the historical endemic species complement to become extinct were birds with body masses of >100 g (18%), primarily from islands whose size was <10 000 km<sup>2</sup>. Relatively few threatened birds fall in these categories.

Table 36. Proportions of the total historical endemic avifauna (of the ten islands) that have become extinct or are classified as critical and endangered.

Body mass (g) Island size (km <sup>2</sup> )	<u>Extinct species</u>		<u>Critical and endangered species</u>	
	< 100 g	> 100 g	< 100 g	> 100 g
< 1 000	4	6	1	1
1 000-10 000	2	10	1	2
> 10 000	6	2	2	5
Totals	12	18	4	8

The majority of critical and endangered species have masses >100 g, and inhabit islands >10 000 km<sup>2</sup>: more than twice as many species in this category are threatened or have already become extinct. This suggests, that on these islands, where extinct species form a very low proportion of all birds inhabiting them since 1600, larger species are more at risk of extinction today. Islands that have experienced a comparatively high proportion of extinction of birds of a certain size have a low proportion of critical or endangered species of that same size category. However, considering all islands, the proportion of large birds at risk of extinction is approximately double the proportion of small birds, despite the fact that proportionally more large birds are already extinct. This is perhaps the result of a new extinction pressure being applied, that of habitat destruction i.e. those birds which survived the early threats of exploitation and predators may be unable to survive the more recent threat of habitat loss.

## Part 2 - Discussion

### Causes of threat

#### *Habitat destruction*

The most important factor affecting currently threatened avifauna is habitat destruction. This threat is not unique to birds and impacts most other taxa (Smith *et al.* 1993b). Of the threatened birds, almost two-thirds (65%) live all or part of their lives in forest (Collar *et al.* 1994 - Fig. 5). Other habitats that have endangered or critical species inhabiting them include scrub, wetlands and savannah and grasslands. Between them, these habitats support the majority of the remaining threatened species (Collar *et al.* 1994).

In addition to forest-dwelling birds, approximately two-thirds of the world's land and fresh water animal species are found in tropical forests (Raven 1988, Stevens 1995b). Overall annual losses of open and closed forests averaged 15.4 million hectares during 1981-1990, or 0.8% per annum, with 40% of their original area already lost (Wilson 1988, Myers 1992, Grainger 1993). This rate appears to be accelerating (Sayer and Whitmore 1991, Whitmore and Sayer 1992, Brooks *et al.* 1997). Balmford and Long (1994) show a positive association between the rate at which tropical forests are being cleared and their biological importance. On average, countries with large numbers of range-restricted forest endemics are losing their forests faster than countries with lower levels of endemism. The reasons underlying this relationship are unclear (Balmford and Long 1994), but it should be noted that these countries are tropical, mostly third-world and therefore poor. Logging plays a vital role in foreign exchange earnings for these countries, which are needed to meet their debts. The economies of these countries are placed before their ecologies, with potentially disastrous effects on endemic (as well as other) species.

## 1. Predation, competition and introduced disease

Introduced vertebrates affect 6% of threatened bird species and all of these are island species. Although this is a small percentage of the total number of threatened species, extinction risk seems to be particularly high for these species: five of the nine most recent extinctions were as a result of introduced predators. Savidge (1987) documents the extinction of the Guam Flycatcher as a result of the introduction of the Brown Tree Snake *Boiga irregularis* and Pimm *et al.* (1995) allude to the disastrous impact the introduction of this snake might have on Hawaiian avifauna. Of the four species that are classified “extinct in the wild”, two (the Guam Rail and Socorro Dove) were driven to this state by introduced vertebrates and for a third (the Kakapo), this has become the primary threat (Collar *et al.* 1994). The original habitats of these three species are islands.

## 2. Hybridization

Another threat stemming from introduced vertebrates is that of hybridization. In New Zealand, hybrids between the endemic Grey Duck *Hymenolaimus malachorhynchus* and the introduced Mallard *Anas platyrhynchos* are common throughout both the main islands and on Chatham Island (Rhymer *et al.* 1994). In some areas, hybrids greatly outnumber “pure” Grey Ducks and there is strong reason to think that only a hybrid form will remain (Rhymer *et al.* 1994). In the Hawaiian islands, where the Mallard breeds with the endangered Hawaiian Duck *Anas wyvilliana*, hybridization appears to be rampant on Hawaii and Oahu (Simberloff 1994). Owen *et al.* (1986) expressed concern that the North American Ruddy Duck *Oxyura jamaicensis*, feral in Britain, would, as it spread to continental Europe hybridize with the rare White-headed Duck *O. leucocephala* of Spain. This has indeed happened in southern Spain and the offspring are viable (del Hoyo *et al.* 1992, Urdiales and Pereira 1993).

### *Inbreeding*

Another potential factor that may play a role in the extinction proneness of island avifauna is that of inbreeding depression. Frankham (1998) showed that island populations were significantly inbred, with breeding co-efficients significantly higher in endemic than non-endemic island populations. Threatened island avifauna may therefore be more difficult to conserve than threatened mainland species. Habitat destruction is likely to increase the effect of inbreeding as small, isolated populations will become inbred over time.

### *Endangered and critical species*

Habitat destruction is the main threat to species in these two categories, affecting 86% of all endangered species and 72% of critical species. Over half the species in this list are found in South America and Asia, and it is in these regions and for this reason that greatest concern is expressed over the next mass extinction (Balmford and Long 1996, Brooks *et al.* 1997).

### Geography of threat

There are more threatened species in mainland areas than on islands. However, the proportion of species under threat on islands is greater than those on the mainland. Approximately 23% of all birds that inhabit islands are under threat (calculated from Monroe and Sibley 1993). Of species that inhabit mainland areas, less than 10% are under threat. The global average of birds under threat, as listed by Collar *et al.* (1994), is 12 %. In terms of avian biodiversity, islands therefore have proportionally a lot more to lose than mainland regions (and have already lost proportionally considerably more). Island species face threat primarily from habitat destruction and introduced vertebrates.

### *Hot Spots*

Myers (1988) identified ten tropical areas that (a) are characterised by exceptional concentrations of species with high levels of endemism and (b) are experiencing unusually rapid rates of habitat depletion. These “hotspots” comprise less than 3.5% of remaining primary forests but harbour over 34 000 endemic plant species and 700 000 endemic animal species. Should these areas lose 90% of their forest cover, 7% of the Earth’s plant species and a similar proportion of animal species would become extinct. Myers (1988) estimated that in the next 25 years, the extinction rate in these ten hotspot areas could be as much as 20 000 times the background extinction rate.

The ten “hotspots” are Madagascar, the Atlantic coast of Brazil, western Ecuador, the Colombian Choco, the uplands of western Amazonia, the eastern Himalayas, Peninsular Malaysia, northern Borneo, the Philippines and New Caledonia. Hawaii and Queensland are also identified as hotspots, but here conservation resources are much more plentiful than in the developing world (in which the ten other hotspots are found), so extinction threats can (at least in theory) be readily reduced.

### *Geography of endangered and critical species*

South America currently holds 73 endangered and 42 critical species, the highest number for any region in this analysis. This has resulted primarily from forest loss in the region. Although there are so many species in these two categories, there have been only three avian extinctions here in recent history. The most recent extinction was in 1977 as a result of habitat destruction (Colombian Grebe *Podiceps andinus* - Table 26). The causes of the other two losses (the Tumaco Seedeater *Sporophila insulata* and the Glaucous Macaw *Anodorynchus glaucus*) were also habitat destruction, these being in 1912 and 1955. Taking into account the effects of a time lag between deforestation and extinction (Heywood *et al.* 1994), many of the endangered and critical species in this region are likely to be in imminent (and perhaps irreversible) danger of extinction.

There are more endangered and critical species in mainland regions than on islands. This is in contrast to the extinction trend, where island extinctions have out numbered mainland ones. This pattern is largely a result of the large number of endangered species on the South American mainland. Of critical species world-wide, however, just under half are found on islands (83 of 168 species). In geographical areas which incorporate both mainland and island areas, islands support the greatest numbers of critical species (Table 37).

Table 37. The number of critical species found on islands and the mainland in regions where islands are present.

Region	Number of species on islands	Number of species on the mainland
Asia	27	14
Africa	26	12
North and Central America (including Hawaii)	19	10

The fate of Hawaii's endemic avifauna is sobering testimony to man's impact on biodiversity. Should the ten critically threatened birds become extinct within the next ten years, this will raise the total number of extinctions on these islands since the arrival of the Polynesians to 111, leaving only 25 of the estimated 136 original species (Pimm 1995) extant by the year 2008. In historical times, the islands will have experienced 27 extinctions, at an extinction rate of 496 species per million species per year, a rate 500 times the background extinction rate.

Mainland Africa has not experienced any avian extinctions since 1600 but currently holds 22 endangered species and 12 critical species. On African islands there are 9 endangered and 26 critical species. The islands with threatened taxa have generally more than one critical species on them, only three having a single species. Four of the nine islands holding critically threatened species have experienced extinctions in recent history (Madagascar, Mauritius, Réunion and the Seychelles) and these currently hold 16 of the 25 critical species. The primary causes of threat on these islands are habitat destruction

and introduced vertebrates. All but one of the extinctions on these islands occurred before this century, the exception being the recent extinction of the Aldabra Warbler *Nesillas aldabrana* in 1986 as a result of introduced vertebrates from the Seychelles. On the Mascarene Islands, there are fewer species currently threatened than have become extinct historically, suggesting that the species most prone to extinction have already been lost. However, seven of the 12 threatened species are critically threatened. This may indicate an imminent effect of a new extinction filter on these islands as the last extinction was in 1876, the new filter being habitat destruction and introduced vertebrates. Historically, exploitation has been the major cause of bird extinctions in the Mascarenes. Two species in Madagascar are on the brink of extinction, if not already extinct (O. L. Langrand, pers. comm.). These are the Madagascar Pochard *Aythya innotata* and Alaotra Grebe *Tachybaptus rufolavatus*.

#### *Endangered and critical endemic species in the 25 most affected countries*

The greatest numbers of endemic species in the endangered and critical categories are found in central and South America (81). It is also here where some of the most severe deforestation is taking place (Sisk *et al.* 1994). Brooks and Balmford (1996) predict that 88 species will be lost from the South American Atlantic forests over some (unspecified) time lag. As this figure includes birds from one small region only, South America as a whole may well be facing a major extinction event.

The Philippines and Indonesia hold the highest number of endangered and critical endemics in the Asian region. Birds in both countries are under threat primarily from habitat destruction. Dinnerstein and Wikramanayake (1993) identify the Philippines as one of the areas with the lowest percentage of protected forest in the Indo-Pacific region, and, if current deforestation rates continue, very little indigenous forest will remain in ten years. Indonesia is ranked as the region with the highest overall level of endemism (all species, including birds) in the world (Sisk *et al.* 1994). Brooks *et al.* (1997) showed that deforestation affects species with small ranges most severely and that these ranges

generally overlap to form “hotspots” (ICBP 1992). Deforestation is often concentrated in these hotspots (Balmford and Long 1996).

The number of species listed as threatened in insular south-east Asia by Collar *et al.* (1994) is very similar to the number of bird species that Brooks *et al.* (1997) predict will become extinct in this region using the species-area curve. They separated island endemics into single-island endemics and intra-archipelago endemics and found that single-island endemics are more at risk than the more widespread species. Small populations of single-island endemics are at greatest risk of extinction here (Pimm *et al.* 1993).

In the Afrotropics, Madagascar has the highest number of endangered and critical avian endemics. Habitat destruction is a pervasive threat to all endemics here with eight of the ten threatened endemics having small ranges or populations. Considering all animal species, Madagascar is ranked 5th in endemic species richness by Sisk *et al.* (1994). The last proven avian extinction here (Snail Eating Coua *Coua delalandei*), some time between 1920 and 1930, was a result of habitat destruction and exploitation. Madagascar is considered by Myers (1988) to be a “hotspot” for extinction. There have been no documented mainland bird extinctions in Africa in recent history although several species have not been seen for many years. Today, however, there are five mainland countries that contain 19 endangered and critical avian endemics. Kenya has four critical species and Somalia one. Sisk *et al.* (1994) list Kenya and Angola as areas of critical global concern and rank the Ivory Coast as the country in the world with the highest forest-loss index.

Of the 17 “North American” endangered and critical endemics, 16 are on the Hawaiian islands. The threats faced by the Hawaiian birds are habitat destruction and introduced vertebrates, the same threats that caused most of the extinctions on these islands (Olson and James 1984). All the species listed as critical have small ranges or populations. Myers (1988) considers Hawaii a “hot spot”, but adds that because conservation resources

are more plentiful here (compared to developing countries), extinction threats can be reduced.

New Zealand has the same number of endangered and critical endemics as Indonesia, only the Philippines having more species in these categories. The New Zealand birds are threatened by habitat destruction and introduced vertebrates and all but three have small ranges or populations. These are the same factors that resulted in the post-moa extinctions, the two most recent of which, in 1955 (the Piopio *Turnagra capensis*) and 1965 (Bush Wren *Xenicus lyalli*), were caused by introduced vertebrates.

### Taxonomy

#### *Family size*

When considering the three threat categories of vulnerable, endangered and critical, family size cannot be used as a good predictor of risk. Although families with the highest number of threatened species tend to be large, not all large families have a high proportion of threatened taxa.

#### *Families with all their species under threat*

The five families with 100% of their species threatened include 10 species that are endemic to a certain region or island group. New Zealand and Madagascar hold three species each, the other four species being found in south-western Australia (3) and New Caledonia. The Australasian species are all classified as vulnerable with the exception of the Kagu *Rhynochetos jubatus*, which is endangered on New Caledonia. Introduced predators, especially dogs, are the main threat to this species. Introduced predators also threaten the three New Zealand species and affect one Madagascan species, whereas habitat destruction affects the Australian and remaining Madagascan species.

### *Endangered and critical species*

The families that hold the largest number of endangered and critical species are all relatively large. The Psittacidae have 36 of these species, the Columbidae 22 and the Emberizidae 18. The number of extant species in these families are 349, 313 and 612 respectively (Monroe and Sibley 1993). However, not all the large families have a large number of endangered or critical species; the Furnariidae have seven of 279 species endangered or critical and the Muscicapidae, seven of 255 species.

### Body size

Blackburn and Gaston (1994) documented the frequency distribution of bird body masses based on data for two-thirds of extant species. Bird body masses are highly skewed to the left, even on a logarithmically transformed body-mass axis, meaning that most bird species are small-bodied. Although bird masses range from 2 g to 80 kg, the median mass is 37.6 g.

Gaston and Blackburn (1995) used data from Collar and Andrew (1988) to show that threatened birds are, on average, larger-bodied than non-threatened species. Size differences between island endemics and species with a continental distribution do not account for this difference. Within taxa there is still a relationship between body size and extinction threat. They also show that the degree of threat faced by threatened species may be related to body size and that there is a genuine tendency for large-bodied birds to be more at risk from extinction than small-bodied species.

It is likely that large-bodied birds have larger home ranges and hence spatial requirements than small-bodied species (Gaston and Blackburn 1995), resulting in an inverse relation between body size and species density. Thus, as habitat area decreases, large birds will become rarer than small birds at a much faster rate. Although it seems possible that body

size may be used as an indicator of the degree of threat amongst threatened taxa, there is not as yet an understanding of the mechanisms by which body size and extinction risk interact.

### Island biogeography theory and extinction rates

The number of species present in an area is a function of its size. Arrhenius (1921) proposed this to be a power function. The derivation of the power function from first principles by Preston (1962) has led to the form  $S = cA^z$  where  $S$  = species,  $A$  = area, and  $c$  and  $z$  are constants (Simberloff 1992). This function is reasonably consistent across different well known taxa in different areas (Rosenzweig 1995).

Rosenzweig (1995) summarised the work of Williams (1943) on  $z$ -values into four patterns, of which three are mentioned here:

1. Nested subsets of habitat - In nested areas with continuous forest  $z < 0.25$ , typically ranging from 0.12 - 0.18 (Johnson *et al.* 1968).
2. Real islands - For islands within an archipelago  $z \sim 0.25$  (Preston 1962), typically ranging from 0.25 - 0.35 (Johnson *et al.* 1968), but decreasing for particularly isolated archipelagos (Diamond and Mayr 1976).
3. Tiny fragments - In small, isolated forest patches  $z \sim 0.6 - 1$ . These contain few individuals of each species so  $z$ -values will be high (Blake and Karr 1984, Pimm and Askins 1995).

The value of  $z$  is traditionally expected to be approximately 0.25 (Preston 1962). This value is used by, amongst others, Brooks and Balmford (1996), Brooks *et al.* (1997) and Pimm and Askins (1995). In effect this relationship predicts that if 90% of a particular habitat is lost, 50% of the species that live in that habitat will become extinct with time.

Pimm and Askins (1995) show that this relationship is true for the endemic species of the forests of eastern North America. These endemics are the species most at risk through the clearing of forest and, at times, local extinction rates exceed the species-area relationship predictions. Brookes and Balmford (1996) show that in forests in the South American Atlantic region, where nearly 90% of the rainforest has been cleared, more endemics restricted to a single Endemic Bird Area (*sensu* Brown and Brown 1992, Stattersfield *et al.* 1998) are threatened with extinction than those found more widely. They predict the number of avian extinctions in the region, through forest loss, will reach 88 and that these will become extinct after some unspecified time lag. This is equivalent to two-thirds of the global extinctions over the last 400 years in one relatively small region. Brooks *et al.* (1997) have shown the number of bird species in south-east Asia predicted to become extinct using the species-area relationship is very similar to the number currently listed as threatened by Collar *et al.* (1994). It should be noted, however, that Boechlen and Simberloff (1986) warned that the species-area model, as well as their faunal collapse and relaxation model, though useful, are not very good indicators of extinction and that care should be taken when working with them. The results from these should not be absolutized and blindly applied to all situations.

#### Endemicity, body size, threat and extinction on ten selected islands

Madagascar has, by a factor of ten, the greatest number of endemic bird species of islands considered in the analysis. Madagascar is also the only “hotspot” (*sensu* Meyers 1988) in this particular analysis and has the highest number of critical and endangered species. Habitat destruction is the main threat to critical and endangered species here. In addition to this, the endemic Alaotra Grebe may have been driven to extinction through genetic swamping by the Little Grebe *Tachybaptus ruficollis*, which first colonised Madagascar in the 1930's (Langrand 1990). Birds of all sizes are threatened, no species of a certain size being more vulnerable.

Jamaica has 25 endemic bird species, but only two of these are critical or endangered. Jamaica is of similar size to Hawaii but has many more endemics. This ratio is perhaps an artefact of past extinction rates: since 1600, Hawaii has experienced 12 extinctions and Jamaica only two. The causes of extinction and threat to birds on Jamaica and Hawaii include habitat destruction but each site also has unique threats. Avian malaria still threatens the Hawaiian avifauna and introduced vertebrates and exploitation are impacting the Jamaican endemics.

The islands of Hawaii and Mauritius have the highest proportion of endemic avifauna in the endangered or critical categories - 75% and 71% respectively (three and five species). The major factor threatening the Mauritian species is habitat destruction in all instances. This is different to the primary extinction cause (exploitation), indicating perhaps that another set of extinctions is imminent, this time however through a different extinction factor.

The extinction and primary threat causes affecting endemic species on six of the ten islands considered have changed (two islands do not have critical or endangered endemics and on Hawaii and Madagascar the causes have remained the same). On two islands there has been a complete change between extinction and threat causes and on the other four a threat cause has been added or lost. The absence of a current threat that had been rated as an extinction cause probably indicates that all the endemic avifauna on the island prone to that specific factor have been lost. The addition of new threat factors may indicate either improved observation techniques in identifying threat or that the endemic avifauna on these islands face new extinction pressures. In the case of the latter, and where threat factors are new, it may be that further extinctions are imminent.

On these islands, birds with body sizes of >50 g and between 100-300 g are most threatened. Only 3% of extinct species fall in the size range 100-300 g; more extinct, critical and endangered species fall in the <50 g category than any other. This is not unexpected, as the median bird body size is 37.6 g for all species. Small birds may be

particularly susceptible to extinction as a result of introduced predators. The effect of habitat alteration on small birds is less than on larger species as the former need smaller ranges in which to live; these species may be able to survive even extreme habitat loss. The greatest threat to smaller birds could be the combined effects of habitat alteration and introduced predators. On islands which have supported birds of <50 g, introduction of predators was the most frequent sole cause of extinction of these birds (n=8) and, in combination with habitat alteration, led to the extinction of a further two species. As habitat patches become smaller, the greater will be the effects of predators, again highlighting the effect of combinations of threat pressures.

The high proportion of larger species under threat, especially on Madagascar and Mauritius, is reason for concern as all these are affected by habitat alteration, and larger birds require large ranges. Although there is no significant correlation between body size, extinction and threat among the endemic species on the selected islands, I suggest that a greater number of relatively large birds will become extinct in the next two decades than smaller birds, failing any conservation action. This is largely due to the extinction debt that is being built up by habitat alteration and its more severe impact on larger-bodied species. This is probably also true for species on the mainland that are critical and endangered and whose habitat is being fragmented.

## Chapter Four: Summary and conclusions.

### Prehistoric extinction, historical extinction and current threat

#### *Extinctions*

There have been 138 avian extinctions since 1600 (Table 38) and between 500-2 000 prehistoric ones (Milberg and Tyrberg 1993). At least 41 families experienced prehistoric extinctions and 45 historical extinctions. Fourteen families that experienced prehistoric extinctions have not lost additional species since 1600; 20 families that have experienced recent extinctions are not represented in the prehistoric extinction record.

In most families that experienced both prehistoric and historic extinctions, there were more than twice as many prehistoric extinctions as historical ones. This is expected as the time spanned in Milberg and Tyrberg's (1993) analysis is almost four times that considered in this analysis. The Rallidae (mostly flightless forms) had the highest number of prehistoric extinctions and the second highest number of historical extinctions. Of families that experienced prehistoric extinctions, only the Psittacidae have experienced more historical extinctions than prehistoric ones. They also account for the greatest absolute number of historical extinctions (20).

Three families have lost all their species in the last  $\pm 1400$  years. There are at present possibly ten families in which all the species are listed as threatened (the uncertainty arises as a result of different classifications used by Clements (1991), Monroe and Sibley (1993) and Collar *et al.* (1994)). These families typically have between one and three species in them. Family-level extinctions are thus set to increase by perhaps three times the historical rate within the next 100 years. Intuitively, families with a smaller number of species face a greater risk of family-level extinction than those with a larger number of species. These small families are phylogenetically more unique and their loss, though small in numbers of species, represents a large evolutionary loss in terms of biodiversity. These species should thus be accorded a high conservation status because their phylogenetic uniqueness.

Table 38. Summary of extinct (post-1600), threatened and non-threatened extant bird species.

- I - Island, M - Mainland, B - Both
- The first row of figures indicates the number of species in each category; the bottom row expresses them in values as percentages
- Extant figures from Monroe and Sibley (1993)

Number of extinct species			Number of extant species				Number of critical species			Number of endangered species			Number of vulnerable species			Total number of threatened species				Percentage of all species threatened			
I	M	B	I	M	B	Total	I	M	B	I	M	B	I	M	B	I	M	B	Total	I	M	B	Total
124	12	2	2328	6113	1261	9702	83	85	4	85	141	9	314	361	29	482	587	42	1111				
90	9	1	24	63	13		48	49	2	36	60	4	45	51	4	43	53	4		21	9	4	12

Within the families listed by Milberg and Tyrberg (1993) that experienced prehistoric extinctions but have not experienced historical extinctions, 29 were non-passerine and 12 were passerine. The Accipitridae (13), Corvidae (7) and Megapodiidae (5) together account for more than half of these. Among families that lack evidence of prehistoric extinctions but have experienced historical ones, 11 were non-passerine and nine passerine. These 20 families have experienced 49 extinctions, the Sturnidae (7), Ardeidae (4) and Raphidae (4) having experienced more than other families. Recent extinctions in families “new” to extinction have generally affected non-passerines and passerines equally. This contrasts with families that experienced prehistoric extinctions but have not experienced historical ones: within these families non-passerines experienced more than twice as many extinctions as passerines. This may simply be because bones of (generally larger) non-passerines are more likely to be preserved than those of the smaller passerine species in the fossil/sub-fossil record. However, if Gaston and Blackburn’s (1995) predictions about body size and extinction are correct (larger birds are more likely to become extinct than smaller birds), coupled with the fact that large birds are more likely to be impacted by exploitation than small birds, then the pattern may well be real.

#### *Extinction and threat*

Collar *et al.* (1994) consider 12% of all avifauna to be threatened. Only three families that have experienced prehistoric and historical extinction, and have currently threatened species, have fewer than 12% of their extant species threatened. In the 25 families that have experienced prehistoric and historical extinctions, an average of 25% of the remaining species are threatened.

One-third of all the currently threatened species are found in 14 families that have experienced both prehistoric and historical extinctions. Table 39 presents a comparison, using some of the more severely impacted families, between prehistoric extinction, historical extinction and current threat. The Drepanididae have been particularly heavily impacted in both extinction periods and also have a number of species that are currently threatened. The long-term survival of most species in this

family is doubtful if the pressures currently being applied through habitat destruction are not alleviated through conservation action. Other families that feature prominently in all three time periods are the Rallidae and Columbidae which, respectively, have experienced 49 and 21 extinctions and have 25% and 18% of the remaining species currently threatened.

Table 39. Comparison, using selected families, between prehistoric extinction, historical extinction and current threat.

Family	Prehistoric extinctions	Historical extinctions		Species threatened		% extinct and threatened since 1600
		(#)	(%)	(#)	(%)	
Aepyornithidae	7	1	(100)			100
Dinornithidae	13	10	(100)			100
Procellariidae	5	1	(1)	27	(35)	35
Anatidae	25	5	(3)	25	(17)	19
Acciptridae	13	0	(0)	24	(8)	8
Megapodiidae	5	0	(0)	8	(44)	44
Rallidae	34	15	(11)	32	(25)	34
Scolopacidae	5	2	(2)	10	(11)	13
Columbidae	13	8	(3)	55	(18)	20
Psittacidae	5	20	(5)	88	(24)	28
Tytonidae	8	2	(11)	5	(29)	37
Strigidae	14	3	(4)	20	(27)	30
Drepanididae	23	11	(35)	16	(80)	87
Corvidae	7			13	(11)	11
Sturnidae		7	(6)	7	(7)	13
Ardeidae		4	(6)	7	(11)	16
Raphidae		4	(100)			100
Turdidae		3	(2)	32	(18)	19
Total	177	99	(71)			

The Megapodiidae experienced five prehistoric extinctions and no historical extinctions, but almost half the remaining species are threatened. This may indicate the beginning of a new extinction event for this family. It is possible that extinction filters may have removed a number of “weaker” species before the arrival of Europeans, the remaining species being able to adapt to pressures introduced by the Europeans. Today, however, threats faced by the megapodes include egg harvesting, introduced predators and declining ranges as a result of human development (Collar *et al.* 1994). Although the first two threats may not be new, they may be exacerbated by the emergence of development and subsequent range restriction as a new threat. This

combination of threats may act as a new filter through which the family will pass, with the consequent loss of some species. This trend, where there were a large number of prehistoric extinctions, comparatively few historical extinctions, but a high current threat rating, is evident to varying degrees in several families in Table 39, including the Procellariidae, Anatidae, Rallidae, Tytonidae, Strigidae and Drepanididae.

Islands of the Pacific Ocean have been similarly affected by extinction in prehistoric and historical times (Tables 8, 25). Currently there are 74 endangered species and 51 critical species inhabiting these islands. This constitutes 77% and 57% of all island-dwelling endangered and critical species respectively. The Philippines and Indonesia hold the highest number of endangered and critical island-dwelling species but have experienced few historical extinctions (only one in Indonesia). There are only two island groups that have experienced a large number of extinctions but also have a relatively large number of endangered and critical species - New Zealand and Hawaii.

The Caribbean had more extinctions across more families in prehistoric times (26) than historical times (9). This region also has a relatively high number of endangered and critical species. The Mediterranean region has not experienced any historical extinctions although it experienced 12 prehistoric ones. There is only one endangered bird species in the region.

In the Indian Ocean there have been over three times more historical extinctions than prehistoric ones. Currently, there are nine endangered and 21 critical species in this region, of which ten inhabit Madagascar and nine the Mascarene Islands (see Figs 9 and 11). In the Mascarene Islands, there have been 33 historical extinctions (there is no mention of prehistoric extinctions by Milberg and Tyrberg (1993)), all of which occurred before 1900. This means there are fewer remaining endemic species on these islands (20 - Horne 1987, Staub 1976) than have already become extinct. Twelve of the remaining 20 endemics are threatened.

### Regions at risk

The Philippines and Indonesia, and Central America and northern South America are regions that are likely to experience many extinctions in the near future. Both regions have a high level of endemism and are severely impacted by habitat loss. Importantly, in neither of these regions is there evidence that species have passed through any significant historical or prehistoric extinction filter.

Mainland Africa, which has not experienced any historical extinctions, is a region that may experience its first avian extinction within the next decade or two. Kenya and Angola are countries identified as areas of global concern (Sisk *et al.* 1994). African extinctions, however, will not be on the same scale as South American or insular Asian extinctions.

### Families at risk

The number of species in a family is important in determining the vulnerability of the entire family to extinction. There are 44 extant families (33 non-passerine, 11 passerine) that contain five or less species (Monroe and Sibley 1993); 12 (27%) of these families have species under threat. Species in ten of these small families inhabit islands only and of these, four have threatened species. Madagascar holds four of the ten island families (one family with threatened species) and New Zealand three (two families with threatened species). Two of the New Zealand families and one from Madagascar are passerine, these being the only threatened, island-dwelling passerine families. Body masses of the New Zealand species range between 6 g and 2 500 g and on Madagascar between 34 g and 220 g. These species inhabit a range of environments from rainforest to scrub and subdesert.

The thirty-two families that do not include threatened species typically comprise taxa with a low level of regional endemism (only five families are endemic to a certain

region) that are not highly habitat specific. The body sizes of the birds in these families varies from large (Struthionidae) to small (Hypocoliidae).

Table 40 lists families that have the highest percentage of their species at risk of extinction and compares it with the number of extant species in the family. All but two of the families are small, holding five or less species.

Table 40. Families most at risk of extinction.

Family	Number of extinct species	Number of extant species	Percentage of species threatened	Endemic to one island group or country?	Principal threat habitat destruction?
Casuariidae	0	4	50	Y	N
Apterygidae	0	3	100	Y	N
Fregatidae	0	5	40	N	N
Phoenicopteridae	0	5	40	(S.Am.)	N
Megapodiidae	0	19	42	N	N
Mesitornithidae	0	3	100	Y	N
Pedionomidae	0	1	100	Y	Y
Rhynochetidae	0	1	100	Y	N
Rynchopidae <sup>†</sup>	0	3	33	N	N
Atrichornithidae <sup>†</sup>	0	2	100	Y	Y
Picathartidae	0	4	50	(Afr.)	Y
Drepanididae <sup>†</sup>	22	21	76	Y	N
Callaeidae	2	2	50	Y	N
Orthonychidae	0	2	50	(Australia)	Y

<sup>†</sup> These taxa are listed at a sub-family level by Monroe and Sibley (1993) but at the family level by Collar *et al.* (1994) and Clements (1991).

Habitat loss as the sole threat affects only four of the 14 families listed in Table 40. The only other sole cause of threat here is an introduced predator affecting the Rhynochetidae species. Combinations of causes threaten more species in these families than sole causes, confirming Bibby's (1994) idea that factors acting in combination with each other are likely to cause more extinctions than are exclusive factors.

In five families, the full species compliment is threatened. These families are small, containing between one and three species. They are all local endemics and are threatened by a variety of factors. The Apterygidae and Mesitornithidae are threatened by both habitat alteration and introduced predators whereas the Rhynochetidae species

is threatened by introduced predators. The remaining two families are threatened by habitat alteration.

The long-term future of the Drepanididae must be uncertain, having lost a third of its species since 1600 and having only four of the remaining 20 apparently free of threat. The main threat is a combination of habitat alteration and avian malaria. However, this family has been heavily affected by extinction historically and prehistorically, so the four non-threatened species may have a very good chance of long-term survival when seen in the context of extinction filters.

One other family (Megapodidae) has a relatively larger number of species threatened. Species in this family are threatened by a diversity of factors and especially combinations thereof. They are not endemic to any one area, being found in Australia and at a number of south Pacific islands.

Body sizes of species in the families included in Table 40 vary from large (Casuariidae, mean = 4 400 g) to small (Pedionomidae, mean = 43 g). The passerine species are generally smaller than the non-passerines with masses between 7 g (a drepanid species) and 250 g species in the Callaeidae family. In small families with threatened species, body size is not correlated with extinction likelihood.

#### Species at risk: a phylogenetic approach

All (403) species listed by Collar *et al.* (1994) as critical and endangered were used in an analysis which considered (1) the historical predisposition of a family to extinction, (2) the proportion of the family under threat and (3) the phylogenetic uniqueness of the family. A score of one to four was assigned to each critical and endangered species for each of the three above criteria. Determination of a score is shown in the key to Table 41. These three scores were summed to give a 'phylogenetic threat rating'. This was then compared with the conservation status of each species as defined by Collar *et al.* (1994).

Table 41 lists the 21 species with the highest ratings. Using a  $\chi^2$  test it was determined that the species listed in this table were a random subset of species from Collar *et al.* (1994). (Of the species with ratings of four and less (those not recorded in Table 41), 31 scored zero, 78 scored one, 77 scored two, 133 scored three and 62 scored four.) There are seven critical species and 14 endangered species that were given a rating of five or more. These species represent 11 families, the family with the most species being the Drepanididae (10). Only three of these families have experienced historical extinction.

The primary causes of threat to these 21 species are habitat alteration and introduced vertebrates: habitat alteration features in 16 (76%) cases and is the sole threat to two species; introduced vertebrates feature in 13 (62%) cases and are the sole threat to two species. According to Collar *et al.* (1994), habitat loss plays a role in the threat to 80% of all endangered and critical species and introduced vertebrates 20%. The proportion of species in Table 41 threatened by habitat loss (76%) is similar to the global average (80% - Collar *et al.* 1994). However, the proportion threatened by introduced predators (62%) is much higher than the global average (20%).

Seventeen species in Table 41 inhabit islands and four inhabit mainland regions. All except two are forest dwellers, the two exceptions inhabiting marine or coastal cliffs. Of the island-dwelling species, ten are found on Hawaii (the Drepanididae) and two on Madagascar.

**Table 41. Analysis of species which have high conservation priority on the basis of the probability of family-level extinction as a function of past extinctions and present threats**

Key:

Proportion of family under threat:

- 4 - above 40% of family under threat
- 3 - 25 - 40% of family under threat
- 2 - 15 - 25% of family under threat
- 1 - 5 - 15% of family under threat
- 0 - 0 - 5% of family under threat

Historical predisposition of family to extinction:

- 4 - above 40% of family extinct
- 3 - 20 - 40% of family extinct
- 2 - 10 - 20% of family extinct
- 1 - 1 - 10% of family extinct
- 0 - 0% of family extinct

Phylogenetic uniqueness

- 4 - 1 species represents over 20 % of the family
- 3 - 1 species represents between 16-20% of the family
- 2 - 1 species represents between 11-15 % of the family
- 1 - 1 species represents between 6-10% of the family
- 0 - 1 species represents between 1-5% of the family

Habitat type: (from Collar *et al.* (1994))

- F - Forest
- S - Scrub
- R - Rocky areas, including cliffs
- M - Marine
- G - Grassland
- W - Wetlands

(Threat codes are as listed in the Introduction)

<u>Species name</u>	<u>Proportion of family under threat</u>	<u>Historical predisposition to extinction within family</u>	<u>Phylogenetic uniqueness</u>	<u>Phylogenetic threat rating</u>	<u>BirdLife threat status</u>	<u>Habitat type</u>	<u>Threat codes</u>
<i>Rhynochetos jubatus</i>	4	0	4	8	EN	FS	169
<i>Phytotoma raimondii</i>	4	0	4	8	CR	S	19
<i>Psittirostra psittacea</i>	4	3	1	8	CR	F	1689
<i>Loxioides bailleui</i>	4	3	1	8	EN	F	168
<i>Hemignathus lucidus</i>	4	3	1	8	CR	F	169
<i>Hemignathus wilsoni</i>	4	3	1	8	EN	F	1
<i>Oreomystis bairdi</i>	4	3	1	8	EN	F	1689
<i>Oreomystis mana</i>	4	3	1	8	EN	F	6
<i>Paroreomyza maculata</i>	4	3	1	8	CR	F	19
<i>Loxops caeruleirostris</i>	4	3	1	8	EN	F	1689
<i>Loxops coccineus</i>	4	3	1	8	EN	F	16
<i>Melamprosops phaeosoma</i>	4	3	1	8	CR	F	1689
<i>Callaeas cinerea</i>	4	0	4	8	EN	F	6
<i>Fregata aquila</i>	4	0	3	7	CR	RM	369
<i>Pelecanoides garnotii</i>	2	0	4	6	EN	RM	1246
<i>Tyto soumagnei</i>	3	2	1	6	EN	F	19
<i>Neodrepanis hypoxanthus</i>	2	0	4	6	EN	F	1
<i>Gymnogyps californianus</i>	1	2	2	5	CR	SGR	2589
<i>Megapodius pritchardii</i>	4	0	1	5	EN	F	12689
<i>Grus leucogeranus</i>	4	0	1	5	EN	W	129
<i>Grus americana</i>	4	0	1	5	EN	W	59

The historical/phylogenetic analysis presented here prompts some conclusions that differ from those of Collar *et al.* (1994). Firstly, not all the “top 21” species are listed by Collar *et al.* (1994) as critically threatened. Secondly, it gives much greater emphasis to the importance of introduced predators in threatening island bird species (and families) with extinction. The classification approach used by Collar *et al.* (1994) treats all species as equal; i.e. the same criteria are applied in the same way to all species. However, by ignoring history, and especially phylogeny, they are not able to include an element of “evolutionary uniqueness” in their status assessments.

However, this analysis also has some short-comings. It fails to place some species which are on the verge of extinction or possibly already extinct such as the Writhed-billed Hornbill *Aceros waldeni* of the Philippines or Madagascar Pochard and Alaotra Grebe in the “top 21” listing. It also lists species which do not represent those most at risk of extinction (e.g. the Ascension Frigatebird *Fregata aquila* and Madagascar Red Owl *Tyto soumagnei*). In terms of ensuring family-level survival, it is perhaps also not realistic that four of the top five priorities should fall within one family.

Although the analysis presented here does not include all of the species included by Collar *et al.* (1994) as being in imminent danger of extinction, Collar *et al.*'s (*op. cit.*) approach does fail to incorporate an evolutionary element in species prioritization. The global loss of a major (family-level) evolutionary pathway potentially has a greater impact on future evolutionary potential than does the loss of a single species from within a diverse family. Given recent molecular advances in knowledge of avian evolution, future listings of the world's threatened bird taxa may benefit by introducing a phylogenetic component to threat rating.

It is unlikely that national or international conservation efforts can be directed equally at all species of equal status in the future. Future conservation efforts will have to effect some form of prioritization exercise. I suggest that those species identified by Collar *et al.* (1994) as critical, which also appear in Table 41, must currently rate as the world's highest bird conservation priorities. On this basis, the five species of greatest concern are: Peruvian Plantcutter *Phytotoma raimondii*, Ou *Psittirostra*

*psittacea*, Nukupuu *Hemignathus lucidus*, Oahu Alauahio *Paroreomyza maculata* and Po'o-uli *Melamprosops phaeosoma*. Four of these five species are Hawaiian Honeycreepers (family Drepanididae).

### Conclusions

Evidence from prehistoric and historical extinctions indicates an avian extinction rate that is between 100 and 1 000 times the background avian extinction rate. The known causes of these extinctions have remained essentially the same over time (exploitation, introduced predators and habitat destruction) but the relative importance of the causes has changed from introduced predators to habitat alteration. Island and mainland endemic birds with small ranges face the greatest risk of extinction over the next few decades, ultimately through habitat loss. A time lag between habitat loss and extinction has resulted in fewer than expected extinctions in some regions, but it is likely that further extinctions are already inevitable and that a greater proportion of large species will become extinct than smaller species. An increasing number of mainland species are likely to become extinct with time as it is here, especially in tropical forests, that very high rates of habitat loss are being experienced.

This study has examined only avian species, which form a very small part of global biodiversity. When considering total global biodiversity, it is likely that the number of species facing imminent extinction is very large. It is probable that the magnitude of these extinctions, considered together with extinctions over the last 1 500 years, will be similar to that of previous mass extinctions, justifying fears of some conservationists that an extinction event, unprecedented in human history, is looming.

## Appendix 1. List of species that have become extinct since 1600

### Author key:

1. Day (1989) \* indicates rumours of survival; incorporates the period 1680-1980
2. Clements (1991) \* indicates on the verge of extinction
3. Greenway (1967) <sup>p</sup> indicates probably extinct
4. Mountfort (1988) <sup>m</sup> indicates there may be survivors
5. Fuller (1987) <sup>s</sup> indicates subspecies; <sup>r</sup> indicates race ;<sup>s</sup> indicates probably extinct\* and subspecies<sup>s</sup>,  
Uses Archey (1941) for recognition of Moa species
6. Collar *et al.* (1994)
7. Thorstrum *et al.* (1995).
8. IUCN emailed list of extinct birds

Masses are estimated from Dunning (1993).

<u>ORDER</u>	<u>FAMILY NAME</u>	<u>COMMON NAME(S)</u>	<u>SPECIES NAME</u>	<u>MASS (g)</u>	<u>PLACE</u>	<u>DATE</u>	<u>CAUSE</u>	<u>AUTHOR</u>
1. Casuariiformes (2)	Dromaiidae (2)	Dwarf Emu / Kangaroo Island Emu	<i>Dromaius baudinianus</i>	10 000	Kangaroo Island <sup>1</sup>	1830 <sup>1</sup>	Ex,HD	1 <sup>s</sup> ,3 <sup>s</sup> ,4,5 <sup>r</sup> ,8
		King Island Emu	<i>Dromaius ater</i>	40 000	King Island <sup>5</sup>	1822 <sup>5</sup>	Ex,HD	5 <sup>r</sup> ,8
2. Dinornithiformes (10)	Dinornithidae (10)	Slender Moa Greater Broad-Billed Moa	<i>Dinornis maximus</i>	275 000	All New Zealand	1850 <sup>1</sup>	?	1,5
			<i>Dinornis torosis</i>	100 000		1670 <sup>4,8</sup>	Ex,HD	4,5,8
			<i>Euryapteryx gravis</i>	100 000		1640 <sup>5,8</sup>	Ex,HD	1,5,8
		Lesser Megalapteryx	<i>Euryapteryx geranoides</i>	40 000	Before 1700 <sup>1</sup>	?	1,5	
			<i>Anomalopteryx parvus</i>	40 000	Before 1800 <sup>1</sup>	?	1	
			<i>Anomalopteryx didiformes</i>	40 000	Before 1800 <sup>1</sup>	?	1,5	
			<i>Anomalopteryx oweni</i>	40 000	Before 1800 <sup>1</sup>	?	1	
			<i>Megalapteryx didinus</i>	40 000	1765 <sup>5,8</sup>	Ex,HD	1,5,8	
			<i>Megalapteryx hectori</i>	40 000	Before 1800 <sup>1</sup>	?	1	
			<i>Megalapteryx benhami</i>	40 000	Before 1800 <sup>1</sup>	?	1,5	

3. Aepyornitheformes (1)	Aepyornithidae (1)	Elephant Bird	<i>Aepyornis maximus</i>	500 000	Madagascar	1650 <sup>4,8</sup>	Ex,HD	1,4,8
4. Podicipediformes (2)	Podicipedidae (2) (Grebes)	Atitlan Grebe	<i>Podilymbus gigas</i>	500	Guatemala	1980 <sup>4</sup> 1987 <sup>8</sup>	HD	2,4,6,8
		Colombian Grebe	<i>Podiceps andinus</i>	400	Colombia	1977 <sup>4,8</sup> , 1980 <sup>2</sup>	HD	2,4,6,8
5. Procellariiformes (2)	Hydrobatidae (1)	Guadelupe Storm Petrel	<i>Oceanodroma macrodactyla</i>	50	Guadelupe (Mexico)	1912 <sup>4</sup>	IV,HD	1,2,3,4,5
	Procellariidae (1)	?	<i>Pterodroma sp.</i>	400	Rodrigues Island	1726	?	8
6. Pelecaniformes (1)	Phalacrocoracidae (1)	Spectacled Cormorant	<i>Phalacrocorax perspicillatus</i>	1 900	Bering Island and satellites	1852 <sup>4</sup>	Ex	1,2,3,5,8
7. Ciconiiformes (6)	Ardeidae (4)	New Zealand Little Bittern	<i>Ixobrychus novaezelandiae</i>	150	New Zealand	1900 <sup>4</sup>	?	4,5 <sup>8</sup>
		Mauritius Night Heron	<i>Nycticorax mauritianus</i>	900	Mauritius	By 1700 <sup>4</sup>	?	4,8
		Rodrigues Night Heron	<i>Nycticorax megacephalus</i>	900	Rodrigues Is.	1761 <sup>4</sup>	?	4,5,8
		?	<i>Nycticorax sp.</i>	900	Réunion Is	By 1700	?	8
	Ciconiidae (1)	?	<i>Ciconia sp.</i>	3 700	Réunion Is.	By 1674	?	8
Threskiornithidae (1)	Réunion Flightless Ibis	<i>Borbonibis latipes</i>	1 200	Réunion Is.	1773 <sup>4,8</sup>	?	3,4,8	
8. Anseriformes (5)	Anatidae (5)	Mauritian Duck	<i>Anas theodori</i>	700	Mauritius	1696 <sup>4,8</sup>	?	4,8
		Labrador Duck	<i>Camptorhynchus labradorius</i>	?	New England, Canadian maritime provinces <sup>1</sup>	1875 <sup>4</sup> 1878 <sup>8</sup>	?	1,2,3,4,5,8
		Auckland Island Merganser	<i>Mergus australis</i>	1000	Auckland Is.	1905 <sup>4,8</sup> , 1910 <sup>1</sup>	IV	1,2,3,4,5,8
		Mauritian Shelduck	<i>Sarkidiornis mauritianus</i>	2600	Mauritius	1698 <sup>4</sup>	?	1,3,5,8
		Chatham Island Swan	<i>Cygnus sumnerensis</i>	7000	Chatham Is.	1590-1690 <sup>4,8</sup>	?	4

9. Falconiformes (3)	Cathartidae (1)	Painted Vulture	<i>Sarcorhamphus sacra</i>	3400	Florida USA	1800 <sup>1</sup>	HD,?	1
	Falconidae (2)	Guadelupe Caracara ????	<i>Polyborus lutosus</i> <i>Falco sp.</i>	900 250	Guadelupe Is. Réunion	1900 <sup>4</sup> 1674	Ex ?	1,2,3,4,5,8 8
10. Galliformes (2)	Phasianidae (2)	New Zealand Quail	<i>Coturnix novaezelandiae</i>	100	New Zealand	1868 <sup>1</sup> , 1875 <sup>4</sup>	?,HD,IV	1,3 <sup>4</sup> ,4,5,8
		Himalayan Mountain Quail	<i>Ophrysia superciliosa</i>	700	Eastern Punjab, India <sup>1</sup>	1868 <sup>4</sup> , 1870 <sup>1</sup> , 1876 <sup>5</sup>	?	1,2,4,5
11. Gruiformes (15)	Rallidae (15)	Wake Island Rail	<i>Rallus wakensis</i>	150	Wake Is.	1945 <sup>1</sup>	Ex	1,2,3,4,5,8
		Tahiti Rail	<i>Rallus ecaudata</i>	150	Tahiti	1900 <sup>1</sup>	?,IV	1
		Modest Rail	<i>Rallus modestus</i>	150	Chatham Is. <sup>1</sup>	1900 <sup>4</sup>	IV,HD	1,2,3,4,5,8
		Dieffenbach's Rail	<i>Rallus dieffenbachii</i>	150	Chatham Is <sup>1</sup>	1840 <sup>4</sup>	IV,HD	1,2,3,4,5 <sup>8</sup> ,8
		Tahitian Red-Billed Rail	<i>Rallus pacificus</i>	150	Tahiti Is	Early 1900's <sup>5</sup>	IV	2,3,5,8
		Sharpe's Rail	<i>Rallus sharpei</i>	150	Indonesia? <sup>2</sup>	?	?	2
		Ascension Island Flightless Crake	<i>Atlantisia elpenor</i>	38	Ascension Is.	1656 <sup>4</sup>	Ex	5,8
		Mauritian Red Rail	<i>Aphanapteryx bonasia</i>	?	Mauritius	1693 <sup>4</sup>	Ex	1,5,8
		Leguat's Rail	<i>Aphanapteryx leguati</i>	?	Rodrigues Is. <sup>5</sup>	1700 <sup>1</sup> , 1760 <sup>4,5</sup>	Ex	1,5,8
		Laysan Rail	<i>Porzana palmeri</i>	60	Laysan Is. <sup>1,5</sup>	1944 <sup>4</sup>	HD	1,5,8
		Sandwich Rail	<i>Porzana sandwichensis</i>	60	Hawaii <sup>1,5</sup>	1884 <sup>4</sup> , 1898 <sup>8</sup>	IV	1,5,8
		Kittlitz's Rail / Kosrae Island Crake	<i>Porzana monasa</i>	60	Kosrae Is.	1827 <sup>4</sup> , 1850 <sup>1</sup>	IV	1,2,4,5,8
		Barred-winged Rail	<i>Nesoclopeus poeciloptera</i>	?	Fiji Islands <sup>6</sup>	1965 <sup>1</sup> , 1973? <sup>8</sup>	IV	1*,6,8
		White Gallinule/Lord Howe Swamphen	<i>Phorphyrio albus</i>	800	Lord Howe Is.	1834 <sup>4</sup>	Ex	1,2,3 <sup>4</sup> ,5,8
		Mascarene Coot	<i>Fulica newtoni</i>	700	Mascarene islands	1693 <sup>4</sup>	?	4,8

12. Charadriiformes (5)	Scolopacidae (2)	White-winged Sandpiper Moorean Sandpiper	<i>Prosobonia leucoptera</i> <i>Prosobonia ellisi</i>	36 36	Tahiti Moorea	1773 <sup>4</sup> 1773 <sup>4</sup>	?,IV ?,IV	1,2,3,4,5,8 1
	Haematopodidae (1)	Canarian Black Oystercatcher	<i>Haematopus meadewaldoi</i>	600	Canary Is. <sup>???</sup>	1913 <sup>4,8</sup>	O	2,4,5 <sup>1</sup> ,6
	Alcidae (1)	Great Auk	<i>Alca impennis</i>	2 000	N Atlantic islands <sup>1</sup> Canada,Denmark,Faeroe Islands, Greenland, Iceland, Russia,UK	1844 <sup>4,8</sup>	Ex	1,4,5,8
	Charadriidae (1)	Javanese Wattled Lapwing	<i>Vanellus macropterus</i>	200	Java	1920 <sup>2</sup>	?	6,8
13. Columbiformes (12)	Raphidae (4)	Dodo Rodrigues Solitaire Réunion Dodo or Réunion Solitaire White Dodo	<i>Raphus cucullatus</i> <i>Pezophaps solitarius</i> <i>Raphus solitarius</i> <i>Victoriornis imperialis</i>	25 000 20 000 25 000 20 000	Mauritius <sup>4</sup> Rodrigues Is. Réunion Is. Réunion Is. <sup>1</sup>	1655 <sup>4</sup> 1765 <sup>4</sup> 1710-1715 <sup>4</sup> 1770 <sup>1</sup>	Ex Ex Ex Ex	1,2,3,4,5,8 1,2,4,5,8 1,4,8 1
	Columbidae (8)	Bonin Wood Pigeon	<i>Columba versicolor</i>	350	Bonin Islands	1889 <sup>4</sup>	HD	1,3,4,5,8
		Ryukyu Wood Pigeon	<i>Columba jouyi</i>	350	Ryukyu Island	1936 <sup>4</sup>	?	2,4,8
		Rodrigues Pigeon	<i>Columba rodericana</i>	350	Rodrigues Is.	1726 <sup>4</sup>	?,IV	4,5,8
		Dutch Pigeon	<i>Alectroenas nitidissima</i>	150	Mauritius <sup>5</sup>	1826, 1835 <sup>4,5,8</sup>	?,IV	1,3,4,5,8
		Passenger Pigeon	<i>Ectopistes migratorius</i>	200	E'm USA <sup>5</sup>	13:00, Sept 1 1914 <sup>5</sup>	Ex,HD	1,2,3,4,5,8
		Tanna Dove	<i>Gallicolumba ferruginea</i>	130	Tanna Island	Post 1774 <sup>5</sup> , 1800 <sup>1</sup>	?	1,2,5
	Choiseul Crested Pigeon	<i>Microgoura meeki</i>	?	Choiseul Is. in Solomon Island group	1904 <sup>4</sup>	IV <sup>6</sup> ,HD	1,2,3,4,5,6,8	
	Red-moustached Fruit Dove	<i>Ptilinopus mercierii</i>	130	French Polynesia <sup>4,8</sup>	1922 <sup>4</sup>	IV <sup>6</sup>	2,4,5 <sup>1</sup> ,6,8	

14. Psittaciformes (21)	Psittacidae (20)	Norfolk Island Kaka	<i>Nestor meridionalis</i>	450	Norfolk Island	1851 <sup>4,5</sup>	Ex	1,2,3 <sup>5</sup> ,4,5 <sup>r</sup> ,8
		Yellow-headed Macaw	<i>Ara gossei</i>	800	Jamaica <sup>1</sup>	1765 <sup>1</sup>	?	1
		Green and Yellow Macaw	<i>Ara erythrocephala</i>	800	Jamaica <sup>1</sup>	1842 <sup>1</sup>	?	1
		Dominican Macaw	<i>Ara atwoodi</i>	800	Dominica, WI	1800 <sup>1</sup>	?	1
		Cuban Red Macaw	<i>Ara tricolor</i>	800	Cuba	1885 <sup>4,5</sup>	Ex,IV	1,3,4,5,8
		Labat's Conure	<i>Aratinga labati</i>	120	Guadeloupe, WI	1722 <sup>1</sup>	Ex,Trade	1
		Carolina Parakeet	<i>Conuropsis carolinensis</i>	?	Carolina, USA	1914 <sup>4</sup>	Ex	1,2,3,4,5
		Guadeloupe Amazon	<i>Amazona violacea</i>	?	Guadeloupe, WI	1750 <sup>1</sup>	Ex.,HD	1
		Martinique Amazon	<i>Amazona martinica</i>	?	Martinique Is., WI	1750 <sup>1</sup>	HD	1
		Mauritius Grey Parrot	<i>Lophopsittacus bensoni</i>	250	Mauritius	1765 <sup>4,8</sup>	?	4,8
		Broad-billed Parrot	<i>Lophopsittacus mauritanus</i>	250	Mauritius <sup>4</sup>	1680 <sup>4,5</sup> ,1675 <sup>8</sup>	?	1,5,8
		Rodriguez Parrot	<i>Necropsittacus rodericanus</i>	250	Rodrigues Is.	1761 <sup>4,5,8</sup> , 1800 <sup>1</sup>	Ex	1,4,5,8
		Mascarene Parrot	<i>Mascarinus mascarenus</i>	?	Mascarene Islands	1834 <sup>4,5,8</sup> , 1840 <sup>1</sup>	?	1,2,3,4,5,8
		Seychelles Parrot	<i>Psitticla wardi</i>	120	Seychelles	1870 <sup>4,8</sup> , 1881 <sup>1</sup> ,	?	1,2,3 <sup>5</sup> ,4,5 <sup>r</sup> ,8
		Réunion Ring-necked Parakeet	<i>Psittacula eques</i>	120	Réunion Is.	1800 <sup>1</sup>	HD	1
		Rodriguez Ring-necked Parakeet	<i>Psittacula exsul</i>	120	Rodrigues Is.	1876 <sup>4,5,8</sup> , 1880 <sup>1</sup>	?,Ex,IV	1,2,3 <sup>m</sup> ,4,5,8
		Black-fronted Parakeet	<i>Cyanoramphus zealandicus</i>	70	Tahiti <sup>4</sup>	1844 <sup>4,5,8</sup> , 1850 <sup>1</sup>	Ex	1,2,3,4,5,8
		Raiatea Parakeet	<i>Cyanoramphus ulietanus</i>	70	Raiatea Is.	1773 <sup>4,5,8</sup>	?,IV	2,3,4,5,8
	Glaucous Macaw	<i>Anodorynchus glaucus</i>	1 200	Paraguay, Uruguay, Brazil, Argentina <sup>4,6</sup>	1955 <sup>4</sup>	HD	2,4,6,8	
	Lorridae (1)	Paradise Parrot	<i>Psephotus pulcherrinus</i>	60	Australia <sup>6</sup>	1927 <sup>4</sup>	IV,HD	2,5,6,8
	New Caledonian Lorikeet	<i>Chamosyna diadema</i>	50	New Caledonia	1860 <sup>4</sup>	Hd,Ex	1*,4	
15. Cuculiformes	Cuculidae	Snail-eating Coua	<i>Coua delalandei</i>	160	Madagascar <sup>6</sup>	1920 <sup>1</sup> , 1930 <sup>4,5,8</sup>	Ex,HD	1,2,3 <sup>p</sup> ,4,5,6,8

16. Strigiformes (5)	Tytonidea (2)	Mauritian Barn Owl Newton's Barn Owl	<i>Tyto sauzieri</i> <i>Tyto newtoni</i>	550 550	Mauritius Mauritius <sup>1</sup>	1700 <sup>1</sup> 1700 <sup>1</sup>	? ,Ex ? ,Ex	1 1
	Strigidae (3)	Commerson's Scops Owl	<i>Scops commersoni</i>	120	Mauritius <sup>1</sup>	1850 <sup>1</sup> , 1836 <sup>8</sup>	?	1,8
		Laughing Owl	<i>Sceloglaux albifacies</i>	?	New Zealand	1900 <sup>1</sup> , 1910 <sup>4,5</sup>	HD,IV	2,5,8
		Rodrigues Little Owl	<i>Athene murivora</i>	160	Rodrigues Is.	1726 <sup>4,5,8</sup>	?	1,4,5,8
17. Apodiformes	Trochilidae	Grace's Emerald	<i>Chlorostilbon bracei</i>	3	Bahamas	1887	?	8
18. Coraciiformes	Alcedinidae	Ryukyu Kingfisher	<i>Halcyon miyakoensis</i>	80	Ryukyu Is.	1841 <sup>4,5</sup> , 1887 <sup>1</sup>	?	1,3,4,5
19. Piciformes	Picidae	Ivory-billed Woodpecker	<i>Campephilus principalis</i>	511	SE USA, Cuba <sup>6</sup>	1991 <sup>6</sup>	HD,Ex	1*,2*,6,8

PTO for Passeriformes

20. Passeriformes (42)	Acanthisittidae (2)	Stephen Island Wren	<i>Xenicus lyalli</i>	16	Stephen Is.	1874 <sup>4,8</sup> , 1894 <sup>1</sup>	IV	1,2,3,4,5,8
		Bush Wren	<i>Xenicus longipipes</i>	16	New Zealand	1965 <sup>1</sup>	IV	4,6,8
	Turdidae (3)	Bonin/Klittlitz's Thrush	<i>Zoothera terristris</i>	80	Bonin and Peel islands	1828 <sup>4,5,8</sup>	IV	1,2,3,4,5,8
		Bay Thrush	<i>Turdus ulietensis</i>	80	Raiatea Is.	1780 <sup>1</sup>	IV	1,3,5
		Grand Cayman Thrush	<i>Turdus ravidus</i>	80	Grand Cayman Is.	1938 <sup>5,8</sup>	HD	2,4,5
	Pachycephalinae (1)	Piopio or New Zealand Thrush	<i>Turnagra capensis</i>	?	New Zealand	1963 <sup>4</sup> , 1955 <sup>8</sup> , 1906 <sup>5</sup>	IV	4,5,8
	Sylviidae (2)	Chatham Island Fernbird	<i>Megalurus fufescens</i>	35	Chatham Is.	1895 <sup>1,5</sup>	IV	1,3,5* <sup>s</sup>
		Aldabra Warbler	<i>Nesittas aldabrana</i>	<10	Seychelles <sup>6</sup>	1986 <sup>6</sup>	IV (rats)	6,8
	Acanthizidae (1)	Lord Howe Island Island Flycatcher	<i>Gerygone insularis</i>	<10	Lord Howe Is.	1920 <sup>1</sup>	?	1 <sup>s</sup> , 2,3 <sup>s</sup> , 5 <sup>s</sup> , 8
	Muscicapidae (1)	Guam Flycatcher	<i>Myiagra freyceniti</i>	13	Guam	1985 <sup>6</sup>	IV (snake)	6,8
	Zosteropidae (2)	Lord Howe Island/Robust White-eye	<i>Zosterops strenua</i>	10	Lord Howe Is.	1928 <sup>4,5,8</sup>	IV	1,3,5,8
		Marianne Seychelles White-eye	<i>Zosterops semiflava</i>	10	Seychelles	1880's <sup>5</sup>	?	1,3,5* <sup>s</sup>
	Meliphagidae (4)	Kioea	<i>Chaetoptila angustipluma</i>	30	Hawaii Is.	1860 <sup>4,5,8</sup>	?	1,2,4,5
		Hawaiian O'o	<i>Moho nobilis</i>	30	Hawaii Is.	1934 <sup>1,4,5,8</sup>	HD	1,2,3 <sup>p</sup> , 4,5
		Oahu O'o	<i>Moho apicalis</i>	30	Oahu Is.	1837 <sup>1,4,5,8</sup>	HD, IV	1,2,4,5,8
		Molokai O'o	<i>Moho bishopi</i>	30	Molokai Is.	1904 <sup>1</sup>	HD, IV	1,2*, 3 <sup>p</sup> , 5
	Emberizidae (2)	Townsend's Finch	<i>Spiza townsendi</i>	15	USA <sup>4</sup>	1833 <sup>4,8</sup>	?	4,8
		Tumaco Seedeater	<i>Sporophila insulata</i>	10	SW Colombia	1912 <sup>6</sup>	HD <sup>6</sup>	2
	Drepanididae (11)	Great Amakihi	<i>Hemignathus sagittirostris</i>	10	Hawaii Is. <sup>1,2,5</sup>	1900 <sup>4,5</sup>	HD	1,2,3 <sup>p</sup> , 4,5,8
		Akiola	<i>Hemignathus obscurus</i>	10	Hawaiian islands	1960 <sup>6,8</sup>	HD, disease, co	1,2,3,4,8
Greater Koa Finch		<i>Psittirostra palmeri</i>	20	Hawaii Is. <sup>1</sup>	1896 <sup>1,4,5,8</sup>	mp, or all 3	1,2,3,4,8	
Lesser Koa Finch		<i>Psittirostra flaviceps</i>	20	Hawaii Is. <sup>1</sup>	1891 <sup>4,8</sup>	HD etc.	1,3 <sup>p</sup> ,	
Kona Finch		<i>Psittirostra kona</i>	20	Hawaii Is. <sup>1</sup>	1894 <sup>5</sup>	HD etc.	2	
Lanai Finch		<i>Dysmorodrepanis munroi</i>	20	Lanai Is.	Post 1913?? <sup>2</sup>	?	1,2,3,4,5,8	
Mamo		<i>Drepanis pacifica</i>	20	Hawaii Is. <sup>1</sup>	1899 <sup>1,4,5,8</sup>	Ex, HD	1,2,3,4,5,8	
Black Mamo		<i>Drepanis funerea</i>	20	Molokai <sup>1</sup>	1907 <sup>1,4,5,8</sup>	HD etc.	4,5,8	
Kona Grosbeak		<i>Chloridops kona</i>	?	Hawaii Is. <sup>5</sup>	1894 <sup>5,8</sup>	HD etc.	4,5,8	

		Kakawihie	<i>Paroreomyza flammea</i>	11	Hawaii Is. <sup>5</sup>	1963 <sup>4,8</sup>	HD	4,6,8
		Ula-Ai-Hawane	<i>Ciridops anna</i>	20	Hawaii Is. <sup>5</sup>	1892 <sup>1,4,5,8</sup>	?	1,2,3,4,5,8
	Fringillidae (1)	Bonin Grosbeak	<i>Chaunoproctus ferreorostris</i>	56	Peel Is. And Bonin islands <sup>1</sup>	1890 <sup>4,5,8</sup>	IV	2,4,5,8
	Icteridae (1)	Slender-billed Grackle	<i>Quiscalus palustris</i>	130	Mexico <sup>5</sup>	1910 <sup>4,5</sup>	?	2,4,5*,8
	Ploceidae (1)	?	<i>Foudia sp.</i>	17	Reunion	1671 <sup>8</sup>	?	8
	Sturnidae (7)	Pohnpei Mountain Starling	<i>Aplonis pelzelni</i>	60	Pohnpei Is.	1956 <sup>4</sup>	?	4
		Kusaie Mountain Starling	<i>Aplonis corvina</i>	60	Kusaie/Kosrae Is.	1828 <sup>4,5,8</sup>	IV	1,2,3,4,5,8
		Mysterious Starling	<i>Aplonis mavornata</i>	60	Society Islands?	1825 <sup>5,8</sup>	?	1,2,3,4,5,8
		Norfolk Island Starling	<i>Aplonis fusca</i>	60	Norfolk Is.	1925 <sup>4,5</sup>	?	4,5,8
		Bourbon /Reunion Crested Starling	<i>Fregilupus varius</i>	80	Reunion Is.	1850-1860 <sup>4,5,8</sup> 1868 <sup>1</sup>	IV	1,2,3,4,5,8
		White Mascarene Starling	<i>Necropsar leguati</i>	80	Mascarene Islands	1840 <sup>1</sup>	?	1
		Rodrigues Starling	<i>Necropsar rodericanus</i>	80	Rodrigues Is.	1726 <sup>4,5,8</sup>	?	1,2,4,5,8
		Blue-Wattled Bulbul	<i>Pycnonotus nieuwenhuisii</i>	25	Sumatra and Borneo	Post 1939	HD	2
	Pycnonotidae (2)	?	<i>Hypsipetes sp.</i>	40	Rodrigues Is.	1600's?	?	8
	Callaeidae (1)	Huia	<i>Heteralocha acutirostris</i>	225	North Is., NZ	1907 <sup>4,5,8</sup>	Ex	1*,3 <sup>p</sup> ,4,5,8

## Appendix 2. List of subspecies that have become extinct since 1600

### Author key:

1. Day (1989) \* indicates rumours of survival; incorporates the period 1680-1980  
 2. Clements (1991) \* indicates on the verge of extinction  
 3. Greenway (1967) <sup>p</sup> indicates probably extinct  
 4. Mountfort (1988) <sup>m</sup> indicates there may be survivors  
 5. Fuller (1987) <sup>s</sup> indicates subspecies; <sup>r</sup> indicates race ; <sup>\*s</sup> indicates probably extinct\* and subspecies<sup>s</sup>.  
 Uses Archey (1941) for recognition of Moa species  
 6. Collar *et al.* (1994)

ORDER(S)	FAMILY NAME	COMMON NAME(S)	SUBSPECIES / RACE NAMES	PLACE	DATE	CAUSE	SOURCE
1. Struthioniformes (1)	Struthionidae (1)	Arabian Ostrich	<i>Struthio camelus syriacus</i>	Syria and Arabia	1941 <sup>1</sup> , 1966 <sup>5</sup>	Ex	1 <sup>s</sup> , 5 <sup>r</sup>
2. Casuariiformes (1)	Dromaiidae (1) (Emus)	Tasmanian Emu	<i>Dromaius novaehollandiae diemenensis</i>	Tasmania	1850 <sup>1</sup>	Ex, HD	1 <sup>s</sup> , 3 <sup>s</sup> , 5 <sup>r</sup>
3. Ciconiiformes (2)	Ardeidae (1)	Bonin Night Heron	<i>Nycticorax caledonicus crassirostris</i>	Peel Island	?	Ex, HD	1 <sup>s</sup> , 3 <sup>s</sup> , 5 <sup>s</sup>
	Threskiornithidae (1)	Principe Olive Ibis	<i>Lambrihis olivacea rothschildi</i>	Principé, Gulf of New Guinea	1st half of this century	?	5 <sup>s</sup>
4. Anseriformes (4)	Anatidae (4)	Coue's Gadwall	<i>Anas strepera couesi</i>	Terania Island, Pacific <sup>1</sup>	1874 <sup>1</sup>	?	1 <sup>s</sup> , 3 <sup>s</sup> , 5 <sup>r</sup>
		Rennel Island Grey Teal	<i>Anas gibberifrons remissa</i>	Rennel Island (In Solomon Islands)	1959 <sup>5</sup>	Intro of alien fish	5 <sup>r</sup>
		Niceforo Brown Pintail	<i>Anas georgia niceforoi</i>	Colombia <sup>5</sup>	1952 <sup>5</sup>	?	5 <sup>r</sup>
		Bering Canada Goose	<i>Branta canadensis asiatica</i>	Kurile and Commander Islands <sup>5</sup>	1914 <sup>5</sup>	?	3 <sup>s</sup> , 5 <sup>r</sup>

5. Galliformes (1)	Tetraonidae (1)	Heath hen	<i>Tympanuchus cupido cupido</i>	New England States, USA <sup>1</sup>	11 March 1932 <sup>5</sup>	Ex,HD	1 <sup>s</sup> ,3 <sup>s</sup> ,5 <sup>s</sup>
6. Gruiformes (3)	Rallidae (3)	Macquarie Island Banded Rail	<i>Rallus philippensis macquariensis</i>	Macquarie Is.	1880 <sup>1</sup>	?	1 <sup>s</sup> , 5 <sup>r</sup>
		Jamaican Wood Rail	<i>Aramides concolor concolor</i>	Jamaica	1881 <sup>1</sup>	IV	1 <sup>s</sup> ,3 <sup>s</sup> ,4
		Iwo Jima Rail	<i>Porzana cinereus brevipes</i>	Iwo Jima	1924 <sup>1</sup>	IV,HD	1 <sup>s</sup> ,3 <sup>s</sup> ,5 <sup>r</sup>
7. Charadriiformes (2)	Scolopacidae (2)	Barrier sub-Antarctic Snipe	<i>Coenocorypha auklandica barrierensis</i>	Little Barrier Island	1870 <sup>5</sup>	?	3 <sup>s</sup> ,5 <sup>r</sup>
		Stewart Island sub-Antarctic Snipe	<i>Coenocorypha auklandica iredalei</i>	Stewart Is.	?	?	5 <sup>r</sup>
8. Columbiformes (5)	Columbidae (5)	Lord Howe Island Pigeon	<i>Columba vitiensis godmanae</i>	Lord Howe Is.	1853 <sup>1</sup>	?	1 <sup>s</sup> ,5 <sup>r</sup>
		Madeiran Wood Pigeon	<i>Columba palumbus maderensis</i>	Madeira	Early 1900's <sup>5</sup>	?	5 <sup>r</sup>
		Cebu Amethyst Fruit Dove	<i>Phapitreron amethystina frontalis</i>	Cebu Is. land	Before 1900 <sup>5</sup>	IV <sup>6</sup> ,HD	5 <sup>r</sup>
		Seychelles Turtle Dove	<i>Streptopelia picturata rostrata</i>	Seychelles	1975 <sup>5</sup>	O	5 <sup>r</sup>
		Norfolk Island Pigeon	<i>Hemiphaga novaeseelandiae spadicea</i>	Norfolk Island	1801 <sup>1</sup>	IV,HD	1 <sup>s</sup> ,3 <sup>s</sup> ,5 <sup>r</sup>
9. Psittaciformes (8)	Psittacidae (8)	Puerto Rican Conure	<i>Aratinga choloptera maugei</i>	Mona Island, Puerto Rico	1892 <sup>1</sup>	Ex,O	1 <sup>s</sup> ,3 <sup>s</sup> ,5 <sup>r</sup>
		Western Carolina Parakeet	<i>Conuropsis carolinensis ludovciana</i>	W Carolina, USA	1914 <sup>4</sup>	Ex	1 <sup>s</sup> ,2,3 <sup>s</sup>
		Eastern Carolina Parakeet	<i>Conuropsis carolinensis carolinensis</i>	E Carolina, USA	1914 <sup>4</sup>	Ex	1 <sup>s</sup> ,2,3 <sup>s</sup> ,4,5
		Culebra Island Amazon	<i>Amazona vittata graciliceps</i>	Culebra Is.	1899 <sup>1</sup>	?	1 <sup>s</sup> ,3 <sup>s</sup> , 5 <sup>r</sup>
		Siquijor Hanging Parrot	<i>Loriculus philipensis siquijorensis</i>	Siquijor Is.	This century <sup>5</sup>	?	5 <sup>r</sup>
		Cebu Hanging Parrot	<i>Loriculus philipensis chrysonotis</i>	Cebu Is.	This century <sup>5</sup>	?	5 <sup>r</sup>
		Macquarie Island Parakeet	<i>Cyanoramphus novaezelandiae erythrotis</i>	Macquarie Is.	1890 <sup>1</sup> , early 1900's <sup>5</sup>	Ex,Iv	1 <sup>s</sup> ,3 <sup>s</sup> , 5 <sup>r</sup>
		Red-fronted Parakeet	<i>Cyanoramphus novaezelandiae subflavescens</i>	Lord Howe Is.	1869 <sup>1,5</sup>	Ex,HD	1 <sup>s</sup> ,3 <sup>s</sup> , 5 <sup>r</sup>

10. Strigiformes (6)	Strigidae (6)	Comoro Scops Owl	<i>Otus rutilus capnodes</i>	Anjouan, Comoro Is. <sup>1</sup>	1890 <sup>1</sup>	?	1 <sup>s</sup>
		South Island Laughing Owl	<i>Sceloglaux albifacies albifacies</i>	New Zealand	1900 <sup>1</sup> , 1910 <sup>4,5</sup> 1914 <sup>8</sup>	HD,IV	1 <sup>s</sup> *,4
		North Island Laughing Owl	<i>Sceloglaux albifacies rubifacies</i>	New Zealand	1900 <sup>1</sup> , 1910 <sup>4,5</sup> 1914 <sup>8</sup>	HD,IV	1 <sup>s</sup> ,3 <sup>s</sup>
		Antigua Burrowing Owl	<i>Speotyto cunicularia amaaura</i>	Antigua, Nevis and St Kitts in WI <sup>1</sup>	1900 <sup>1,5</sup>	IV	1 <sup>s</sup> ,3 <sup>s</sup> ,5 <sup>r</sup>
		Guadeloupe Burrowing Owl	<i>Speotyto cunicularia guadeloupensis</i>	Marie Galante, WI <sup>1</sup>	1900 <sup>1</sup>	IV	1 <sup>s</sup> ,3 <sup>r</sup>
		Lord Howe Island Morepork	<i>Nonox novaeselandiae albaria</i>	Lord Howe Island	1940 <sup>5</sup>	?	5 <sup>r</sup>
11. Piciformes (1)	Picidae (1)	Guadelupe Flicker	<i>Colaptes cafer rufipileus</i>	Guadelupe Is., Mexico <sup>1</sup>	1906 <sup>1</sup>	HD,IV	1 <sup>s</sup> ,3 <sup>s</sup>

PTO for Passeriform subspecies listing

12. Passeriformes (61)	Acanthisittidae (2)	North Island Wren	<i>Xenicus longipipes stokesi</i>	North Island	1900 <sup>1</sup> } 1972 <sup>4,8</sup>	IV	1 <sup>5</sup> ,4
		Stead's Bush Wren	<i>Xenicus longipipes variabilis</i>	Stewart Is <sup>1</sup>	1965 <sup>1</sup> }	IV	1 <sup>5</sup> ,4
	Troglodytidae (3)	Guadelupe Bewick's Wren	<i>Thryomanes bewikii brevicauda</i>	Guadelupe Is.	1897 <sup>5</sup> , 1892 <sup>1</sup>	IV,HD	1 <sup>5</sup> ,3 <sup>5</sup>
		Martinique House Wren	<i>Troglodytes aedon martinicensis</i>	Martinique Is.	1900 <sup>1</sup>	IV,HD	1 <sup>5</sup> ,3 <sup>5</sup>
		St Lucia House Wren	<i>Troglodytes aedon mesoleucus</i>	St. Lucia, WI	1971 <sup>1</sup>	IV,HD	1 <sup>5</sup>
	Turdidae (12)	Lord Howe Island Blackbird	<i>Turdus poliocephalus vivitinctus</i>	Lord Howe Is.	1920 <sup>1,5</sup>	IV	1,3 <sup>5</sup> ,5 <sup>5*</sup>
		Mare Island Thrush	<i>Turdus poliocephalus mareensis</i>	Mare Is.	During WW2	?	3,5 <sup>5*</sup>
		Lifu Island Thrush	<i>Turdus poliocephalus pritzbueri</i>	Lifu Is.	During WW2	?	5 <sup>5*</sup>
		Yakushima Seven Islands Thrush	<i>Turdus celaenops yakushimensis</i>	Yakushima Seven islands	1904 <sup>5</sup>	?	5 <sup>5*</sup>
		Lanai Omao	<i>Myadestes obscurus lanaiensis</i>	Lanai Is.	1931 <sup>1</sup>	HD,O	1 <sup>5</sup> ,3 <sup>5</sup>
		Oahu Omao	<i>Myadestes obscurus oahensis</i>	Oahu Is.	1825 <sup>1</sup>	HD	1 <sup>5</sup> ,3 <sup>5</sup>
		Molokai Omao	<i>Myadestes obscurus rutha</i>	Molokai Is	1963 <sup>5</sup>	?,IV,HD	1 <sup>5</sup> ,3 <sup>5</sup>
		Cebu Black Shama	<i>Copsychus niger cebuensis</i>	Cebu Is.	1956 <sup>5</sup>	IV	5 <sup>5*</sup>
		Lanai Thrush	<i>Myadestes obscurus lanaiensis</i>	Lanai Is.	1931 <sup>5</sup>	IV,?HD	1 <sup>5</sup> ,3 <sup>5</sup> ,5 <sup>5*</sup>
		Oahu Thrush	<i>Myadestes obscurus oahensis</i>	Oahu Is.	First half of 19th century <sup>5</sup>	IV,HD	1 <sup>5</sup> ,2,5 <sup>5*</sup>
		Burma Jerdon's Babbler	<i>Moupinia altirostris altirostris</i>	S'm Burma	During WW2 <sup>5</sup>	?	5 <sup>5*</sup>
		Muriel's Chat	<i>Saxicola dacotiae murielae</i>	Allegranzo Is.	Post 1913 <sup>5</sup>	?	5 <sup>5*</sup>
Dicaeidae (1)	Cebu Orange-bellied Flowerpecker	<i>Dicaeum trigonostigma pallida</i>	Cebu Is.	1963	HD	5 <sup>5*</sup>	
Sylviidae (6)	Laysan Millerbird	<i>Acrocephalus familiaris familiaris</i>	Laysan Is.	1920 <sup>1</sup> , 1912-1923 <sup>4,5</sup>	HD	1 <sup>5</sup> ,3 <sup>5</sup> ,5 <sup>5*</sup>	
	Lord Howe Island Grey Warbler or Lord Howe	<i>Grygone igata insularis</i>	Lord Howe Is.	Post 1918 <sup>5</sup> , 1920 <sup>1</sup>	?	1 <sup>5</sup> ,2,3 <sup>5</sup> ,5 <sup>5*</sup>	

		Gerygone Hautrine Island Long- billed Reed Warbler	<i>Acrocephalus caffra garretti</i>	Hautrine Is.	?	?	5**
		Raiatea Long-billed Reed Warbler	<i>Acrocephalus caffra musae</i>	Raiatea Is.	?	?	5**
		Astrolabe Nightingale Reed Warbler	<i>Acrocephalus luscini astrolabii</i>	Pacific somewhere	?	?	5**
		Diato Japanese Bush Warbler	<i>Cettia diphone restricta</i>	Borodino (Diato) islands	?	?	5**
	Paridae (1)	Daito Varied Tit	<i>Parus varius orii</i>	Borodino Is.	1923 <sup>5</sup>	?	5**
	Muscicapidae (3)	Tonga Tabu Tahiti Flycatcher	<i>Pomarea nigra atra</i>	Tahiti	1800 <sup>1</sup>	?	1
		Maupiti Flycatcher	<i>Pomarea nigra pomarea</i>	Maupiti, Solomon islands	1823 <sup>5</sup>	?	5**
		Lord Howe Island Fantail	<i>Rhipidura fuliginosa cervina</i>	Lord Howe Is.	1924	IV	1,3
	Zosteropidae (2)	Cebu Everett's White- eye	<i>Zosterops everitti everitti</i>	Cebu Is.	Early 19th century	?	5**
		Lord Howe Island Grey-backed White Eye	<i>Zosterops lateralis tephroleura</i>	Lord Howe Is.	?	?	5**
	Meliphagidae (1)	Chatham Island Bell Bird	<i>Anthornis melanura melanocephalus</i>	Chatham Is.	1906 <sup>1,5</sup>	HD,IV	1,3 <sup>5</sup> ,5**
	Emberizidae (3)	St Kitts Puerto Rican Bullfinch	<i>Loxigilla portoricensis grundis</i>	St. Kitts Is.	1880 <sup>5</sup> , 1900 <sup>1</sup>	?	1 <sup>5</sup> ,3 <sup>5</sup> ,5**
		Guadelupe Rufous- sided Towhee	<i>Pipilo erythrophthalmus consobrinus</i>	Guadelupe Is.	1897 <sup>5</sup> , 1900 <sup>1</sup>	IV monkeys	1 <sup>5</sup> ,3 <sup>5</sup> ,5**
		Santa Barbara Song Sparrow	<i>Melospiza melodia graminea</i>	California <sup>5</sup>	1960's <sup>5</sup>	?	5**
	Drepanididae (12)	Molokai Alauwahio	<i>Loxops maculata flammea</i>	Molokai Is	1970 <sup>1</sup>		1 <sup>5</sup> ,3 <sup>5</sup> ,
		Lanai Alauwahio	<i>Loxops maculata montana</i>	Lanai Is.	1937 <sup>1</sup>	HD,	1 <sup>5</sup> ,3 <sup>5</sup>
		Oahu Akepa	<i>Loxops caccinea rufa</i>	Oahu Is.	1900 <sup>1</sup>	competition	1 <sup>5</sup> ,3 <sup>5</sup>
		Hawaiian Akioloa	<i>Hemignathus obscurus obscurus</i>	Hawaii Is.	1940 <sup>1</sup>	and avian malaria	1 <sup>5</sup> ,3 <sup>5</sup> ,5** <sup>5</sup> ,6

		Lanai Akioloa	<i>Hemignathus obscurus lanaiensis</i>	Lanai Is.	1894 <sup>1</sup>	or combination of all	1 <sup>2</sup> ,2,3 <sup>5</sup> ,5** <sup>6</sup> ,6
		Oahu Akioloa	<i>Hemignathus obscurus ellisianus</i>	Oahu Is.	1840 <sup>1,5</sup>		1 <sup>2</sup> ,2,3,5** <sup>6</sup> ,6
		Kauai Akioloa	<i>Hemignathus obscurus procerus</i>	Kauai Is.	1965 <sup>1</sup>	"	1 <sup>2</sup> ,2,6
		Oahu Nukupuu	<i>Hemignathus lucidus lucidus</i>	Oahu Is.	1890 <sup>1,5</sup>	"	1 <sup>2</sup> ,3 <sup>5</sup> ,5**
		Kauai Nukupuu	<i>Hemignathus lucidus hanapepe</i>	Kauai Is.	1905 <sup>1</sup>	"	1 <sup>2</sup>
		Maui Nukupuu	<i>Hemignathus lucidus affinis</i>	Maui Is.	1896 <sup>1</sup>	"	1 <sup>2</sup> ,3 <sup>5</sup> ,
		Lanai Creeper	<i>Paroreomyza montana montana</i>	Lanai Is.	1930's <sup>5</sup>	HD	5**
		Laysan Apapane	<i>Himatione sanguinea freethii</i>	Laysan Is.	1925	HD	1
	Fringillidae (1)	McGregor's House Finch	<i>Carpodacus mexicanus mcgregori</i>	San Benito Islands, USA	1838 <sup>5</sup>	?	5**
	Icteridae (2)	Slender-billed Grackle	<i>Quiscalus palustris mexicanus</i>	Mexico <sup>5</sup>	1910 <sup>4,5</sup>	?	4,5**
		Grand Cayman Jamaican Oriole	<i>Icterus leucopteryx bairdi</i>	Grand Cayman Is.	Post WW2 <sup>5</sup> Pre-1950	?	5**
	Ploceidae (1)	Réunion Fody	<i>Foudia madagascariensis bruante</i>	Réunion Is.	1776 <sup>1</sup>	?	1 <sup>2</sup>
	Sturnidae (1)	Lord Howe Island Starling	<i>Aplonis fuscus hullianus</i>	Lord Howe Is.	1925 <sup>1</sup>	IV	1 <sup>2</sup> ,3 <sup>5</sup>
	Oriolidae (1)	Cebu Dark-throated Oriole	<i>Oriolus xanthonotus assimilis</i>	Cebu Is.	1906 <sup>5</sup>	?	5**
	Callaeidae (1)	South Island Kokako	<i>Callaeas cinerea cinerea</i>	South Is., NZ	1961 <sup>5</sup>	?	5**

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Carla Sutherland  
University of Cape Town  
January, 1994.

## Abstract

This thesis examines research methods into sexual harassment. The central proposition investigated is whether the research process can be used to play an advocacy and educational role while still retaining scientific rigour. The concept of sexual harassment is explored, beginning with an analysis of the first reported case of sexual harassment in South Africa. It is argued that sexual harassment is a pervasive social problem, faced primarily, but not exclusively by women. Gender hierarchies, both social and organisational, are identified as the root cause of sexual harassment. It is suggested that one of the most important challenges faced in undertaking research into sexual harassment is the shaping of a widely accepted definition of it. The questions of spectrum (from sexist insult to rape) and variety (*quid pro quo* and environmental harassment) are identified as two factors which complicate the achievement of such a definition. It is argued that there are particular problems associated with the labelling of behaviours as sexual harassment that need to be taken into account in developing effective research programmes. The research methods used by the Committee of Enquiry into Sexual Harassment at the University of Cape Town are described and evaluated. It is concluded that a multi-method research process, which includes an education and advocacy component, is the most effective research strategy to adopt in investigating sexual harassment.

## *Chapter One*

# **INTRODUCTION**

A picture is emerging of too many young men on campus engaging in behaviors that can best be described as emotional and psychological harassment. Such behaviors which are often invasive and disrespectful, can poison the college experience for women. Although some of these behaviors at first glance appear to be individual, unrelated acts, they are instead part of a pattern representing widespread group behaviour. (Hughes & Sandler, 1988: 3).

### **Background to the Study**

In the United States of America (USA) almost all universities have policies prohibiting sexual harassment as well as educational programmes to discourage its occurrence. These policies and programmes have arisen out of a recognition of both the widespread nature of sexual harassment, and the detrimental effect that it has on students and university employees.

Dzeich and Weiner (1984), in one of the most comprehensive studies in the USA, found that almost a third (30%) of women students are sexually harassed by a member of academic staff while they are at University. They further demonstrated that sexual harassment had resulted in students giving up work, research, education, and career opportunities. In addition, Adams, Kottke and Padgitt (1983) demonstrated that some students modified their academic plans in response to a fear that they may be sexually harassed: in one survey of women students they found that 13 percent of respondents "avoided taking a class or working with certain professors because of the risk of being subjected to sexual advances" (Cited in Paludi, 1990: 3).

In addition, and perhaps most importantly, in the USA sexual harassment is more than just a personal or moral issue: under Title VII of the Civil Rights Act of 1964 sex discrimination in employment, including sexual harassment, is prohibited. Universities which do not have policies and programmes addressing sexual harassment are vulnerable to staff holding the institution liable for not taking adequate steps to protect them from sexual harassment (Hughes & Sandler, 1988: 8). While all major employer bodies in the USA are covered by this legislation, universities, as educational institutions, have additional responsibilities:

Though sexual harassment in any situation is reprehensible, it must be a matter of particularly deep concern to an academic community in which students and faculty are related by strong bonds of intellectual dependence and trust. ... Not only does sexual harassment betray the special bond between teacher and student, but it also exploits unfairly the power inherent in an instructor's relationship to his or her student (Dean's advisory committee on grievance procedure at Yale, 1977 cited in Paludi, 1990: 5).

The moral and ethical arguments raised above are further underscored by a legal responsibility specific to educational institutions. Under Title IX of the 1972 Education Amendment of the Civil Rights Act, sex discrimination against students at educational institutions is prohibited<sup>1</sup>.

### **Purpose of the Study**

It is not possible to report on the number of students that are sexually harassed while at university in South Africa: to date no studies measuring the extent of sexual

---

<sup>1</sup> See *Alexander vs Yale* (1977). To date this is the only case of sexual harassment filed against a university brought under this legislation. While the case was dismissed, of significance is that the District Court hearing the case ruled that cases of sexual harassment of students should be recognised as potential violations of Title IX's ban against sex discrimination in education. See Paludi, 1990: 4-5 for fuller discussion.

harassment have been undertaken at any university in Africa<sup>2</sup>. At present South African universities have no legal obligation to address sexual harassment, and until 1991, the University of Cape Town (UCT) was the only university in South Africa to have a formal policy prohibiting sexual harassment. In this context, it is not surprising to find that there is a paucity of literature addressing the question of sexual harassment in South Africa.

My own interest in this field began in 1990 when I was appointed as a research assistant to the first institutionally sponsored research project investigating sexual harassment at a university in South Africa. The Committee of Enquiry into Sexual Harassment at the University of Cape Town, was established by the Vice-Chancellor and Principal, Dr Stuart Saunders, in November 1989.

Partly in response to the work undertaken by the Committee of Enquiry, there is an increasing recognition by universities in South Africa that sexual harassment is a problem in need of attention<sup>3</sup>. Since 1991, five other universities have adopted formal policies against sexual harassment, and five universities have established investigative committees into sexual harassment<sup>4</sup>. Indeed, one of the major motivations for this thesis being written is the need to respond to the interest generated by the work of the Committee. During the course of our work, and in

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<sup>2</sup> Personal communication from Dr Eddah Gachukia, Executive Director of the Forum for African Women Educationalists (FAWE). FAWE is a network of eminent women (government ministers and university vice-chancellors) involved in education in Africa.

<sup>3</sup> In 1992 the first national workshop on sexual harassment at universities was held at the University of Cape Town. Sixteen universities were represented at the workshop by students and staff from those universities. This workshop was prompted by the requests for assistance received while the work by the Committee of Enquiry into Sexual Harassment at UCT was being undertaken.

<sup>4</sup> The universities which had formal policy on sexual harassment in 1993 were UCT, University of the Witwaterstrand, University of the Western Cape, University of Natal, Rhodes University and University of Durban Westville. Institutional research into questions related to sexual harassment have been carried out at UCT, University of the Witwaterstrand, University of Durban Westville, University of the Western Cape, Stellenbosch University and Fort Hare University.

particular following the public release of our final report, we have received repeated requests for advice from individuals and institutions on how to deal with sexual harassment.

In giving advice I have had to rely almost exclusively on literature produced outside of Africa, primarily in the USA, Canada, Australia and Great Britain. The literature generated in these countries has proved to be extremely useful in developing a broad conceptual analysis of sexual harassment, and the ways in which it can be addressed in many institutional settings. However, as would be expected, the research work undertaken and reported on has also been shaped by the particular concerns and priorities of those institutions and countries: concerns and priorities that are not necessarily the same as those faced by a developing country in Africa.

We discovered this problem shortly after the Committee of Enquiry began its investigation at UCT. Firstly, we found that very little of the research work in this field undertaken in the USA, Canada, Australia and Great Britain was readily available in South Africa. No libraries in South Africa had copies of books that are regarded as seminal in this field. Further, sexual harassment at universities remains a relatively new field even in North America and Europe, so that much of the literature reporting on research projects investigating sexual harassment at universities is carried in journals, rather than in books. Moreover, we found that the research work on sexual harassment is generally reported in legal journals, or journals addressing policy making in higher education, which were not subscribed to by UCT, or by other South African universities.

We found that a great deal of the research work in overseas countries has been driven by legislative considerations, specific to those countries. In North America and Europe sexual harassment is recognised as an unlawful form of sex discrimination. The legal framework within which sexual harassment is viewed has given rise to the

development of a particular research approach to the understanding of sexual harassment. It is my contention that the framework of sexual harassment as sex discrimination against women has narrowed the way in which sexual harassment is explored in both North America and Great Britain.

For instance, in the literature reviewed, particularly from the USA, many of the definitions of sexual harassment used are gender specific. That is, sexual harassment is defined as a "women's only" experience. In other words the possibility of men being harassed, either by other men or by women is excluded. One of the consequences of the definitional exclusion of men, is that men's experience of sexual harassment remains an under-researched area of study, and many of the most influential studies of sexual harassment have excluded men from their samples (Benson & Thompson, 1982; Crull, 1979; Gutek, 1985; Till, 1980). This is despite the fact that those studies which have included men have shown that men can, and do, experience sexual harassment (Merit System Protection Board Report, 1981; Committee of enquiry into sexual harassment at UCT, 1991). In other words, many of the most influential studies on sexual harassment have examined a social problem - that involves gendered interactions - from the point of view of one gender.

Studies on sexual harassment in a university setting have tended to focus on the relationship between male staff and female students. Relationships between staff, between students, and between female staff and male students have been virtually ignored. The needs and priorities of our own Committee of Enquiry did not match those of universities in North America and Great Britain. The emphasis of our work was on relationships *between* students. In part, this emphasis may be explained by a specific set of circumstances that gave rise to the establishment of the Committee of Enquiry into Sexual Harassment at UCT. However, the interest generated by our work does suggest that the concerns addressed by UCT are shared more broadly by a range of universities in Southern Africa.

The establishment of the Committee followed, most directly, in the wake of the distribution of an anonymous pamphlet at the University in September 1989<sup>5</sup>. The pamphlet alleged that four students, named in the pamphlet, were known rapists on campus. The pamphlet, calling for the "castration" of all rapists, accused the University Administration of not taking the issue of sexual harassment and assault seriously enough. Finally, it was suggested that sexual violence and harassment were frequent occurrences at the University:

Some men on this campus have declared war against women. They have claimed the right to decide where women should be and when. They are dictating to women what they should wear and how they should live their lives. They are harassing, assaulting and raping the women of UCT. (Anonymous pamphlet, 1989).

The terms of reference of the Committee required that we conduct a "university wide" investigation into "attitudes, traditions and accepted behaviour" that gave rise to "infringements of the University's policy in regard to sexual harassment". The terms of reference placed a special emphasis on students and, more particularly, the "fears on the part of women [students] in residence"<sup>6</sup>. In October 1991 we submitted our final report to the Vice-Chancellor, who released it as a public document.

We found that relationships between students could profoundly affect their ability to participate in the academic, as well as the social, life of the university. Harassment of students by other students has similar consequences to harassment of students by academic staff members. Just as studies in North America have shown that sexual harassment by academic staff members can result in lost educational opportunities,

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<sup>5</sup> See *Appendix One*: Copy of the Pamphlet.

<sup>6</sup> See *Appendix Two*: Terms of reference of the Committee of Enquiry into Sexual Harassment at UCT.

and cause some students to modify their academic programmes to avoid the possibility of harassment, we found that some students, in response to experiences of sexual harassment or violence by other students, left the university, changed residences, did not attend lectures, and/or avoided using places set aside for students to study, such as the library and computer centre.

Mainstream literature dealing with academic sexual harassment does not adequately deal with this question. For instance, in *Ivory Power*, one of the most influential examinations of sexual harassment issues at universities in the USA, the question of student-student relationships is not addressed. It is only in the preface to the book that it is argued that the "new campus issue is student peer harassment" (Paludi, 1990: xvii). However, studies of relationships between students at universities in North America are now being conducted.

### **Research Methodology**

Fitzgerald (1990: 22), one of very few researchers who directly addresses methodological questions in relation to the study of sexual harassment, argues that there is currently "disarray" in the literature on sexual harassment. Part of the problem lies in the failure of researchers to clarify the nature of their research methodologies. Research methodology was one aspect of the work of the Committee of Enquiry that was not dealt with adequately in our Final Report. Since the release of the report, and the establishment of further research projects at other universities in South Africa, there has been an increasing interest in this area of our work.

A review of literature from the USA, reveals that a great deal of emphasis has been placed on the measuring of sexual harassment. While we acknowledge that knowing the extent of a problem is an important aspect of understanding it, our central concerns were different. The tasks we set for ourselves were to explore the concept of sexual harassment, the nature and extent of students' experiences of sexual

harassment and sexual violence, attitudes towards sexual harassment, institutional culture which encouraged sexual harassment, and attitudes towards university authority.

Given this research agenda, we found in reviewing projects conducted outside of South Africa that their research methods were too narrow to serve our goals. Questionnaires were the most common research tool used. We spent a great deal of time developing our own questionnaire, but ultimately found that its usefulness was limited primarily to assisting us in understanding what behaviours students labelled as sexual harassment. Partly in response to the difficulties we had developing a questionnaire that met our needs, we developed a multi-faceted research approach that included interviews with policy makers and student leadership, focused discussion groups with randomly selected students (run by specially trained student research assistants), observation, a telephone-in, and individual interviews with self-selected students who had experienced some form of harassment. These projects are discussed in detail in Chapter Five.

## **Overview of Thesis**

Chapter Two examines the concept of sexual harassment, beginning with an analysis of the first reported case of sexual harassment in South Africa. It is argued that sexual harassment is a pervasive social problem, faced primarily but not exclusively by women. Gender hierarchies, both social and organisational, are identified as the root cause of sexual harassment. Finally, it is suggested that sexist ideology masks the reality of sexual harassment, so that sexually harassing behaviour is frequently not labelled as such.

Chapter Three looks at challenges posed by attempts to research sexual harassment. It is suggested that the need to shape a widely accepted definition of sexual harassment is the most important challenge faced in undertaking research into sexual

## Chapter Two

# THE SETTING OF A PROBLEM

Intimate violation of women by men is sufficiently pervasive ... as to be nearly invisible. Contained by internalized and structural forms of power, it has been nearly inaudible. Conjoined with men's control over women's material survival ... it has become institutionalized. (MacKinnon, 1979: 1).

The first reported case of sexual harassment in South Africa was heard in the Industrial Court in February 1989 (*J v M Ltd*, 1989). The case is worth examining in some detail as it provides a useful framework within which to discuss sexual harassment in South Africa. It highlights many of the problems associated with dealing with sexual harassment in the work place and provides a useful introduction to the problems associated with undertaking research into this "perplexing and persistent problem" (Welzenbach, 1986: 1).

### Summary of Case

*J v M Ltd* concerned a senior executive charged at an internal company hearing of having "sexually molested and harassed" a female employee "against her will". Specifically, he was alleged to have "fondled her breasts". This was one of many complaints that had been received "from the time the applicant first joined the [company]". The company claimed that the General Manager had on "several occasions discussed [the] applicant's behaviour with him", and that he had been issued with a "final warning"<sup>1</sup>. At the disciplinary hearing, chaired by the General Manager of the company, he was found guilty of sexual harassment and given the opportunity to resign. This he did, but subsequently withdrew his resignation and was dismissed.

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<sup>1</sup> This was disputed by the applicant, but accepted by the Industrial Court.

The senior executive then brought an application for reinstatement to the Industrial Court<sup>2</sup>. The applicant contended that the company had not followed company procedures and that the sanction imposed had been "too harsh". He suggested that his behaviour was "no more than mildly flirtatious or mediterranean". In addition, in support of his case the applicant submitted two petitions. The first was signed "by all the ladies in the office controlled by [him] ... pleading for compassion and stating that they did not feel offended or sexually harassed" by his past behaviour. The second was signed by "some 500 employees" of the company, requesting the management to "reconsider his dismissal". Finally, the applicant asked that the fact that the complainant had withdrawn the charges be taken into consideration. (*J v M Ltd*, 1989: 757-762).

The application was dismissed. The Court found the senior executive guilty of sexual harassment, which was viewed as a "serious matter which require[d] attention from employers". The sanction imposed by the company, namely dismissal, was upheld as in the view of the Court the seriousness of the matter warranted this action. The petitions were dismissed on technical grounds, being ruled as inadmissible evidence. The withdrawal of the complaint was also summarily dismissed:

The first complainant subsequently sought to withdraw her complaint on the basis that the applicant did not intend to harass her sexually. She at no time withdrew the facts. The facts establish sexual harassment. The fact that she subsequently felt sorry for the applicant proves no more than she is a nice person. (*J v M Ltd*, 1989: 760).

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<sup>2</sup> The application was brought in terms of s 43 of the Labour Relations Act 28 of 1956 which gives the Industrial Court the authority to reinstate employees if it is satisfied that an "unfair labour practice" has taken place.

As the first reported case of sexual harassment, *J v M Ltd* established a number of important precedents. Firstly, it signalled that the Industrial Court viewed sexual harassment as an "unfair labour practice". Secondly, it established that the Industrial Court regarded it as an employer's responsibility to ensure that sexual harassment was not happening in the workplace. Finally, in the absence of a legal definition of sexual harassment, it provided an initial legal framework within which to understand this complex issue.

Notwithstanding the importance of these precedents, the central irony of *J v M Ltd* remains. The setting of these precedents occurred not through a victim of harassment seeking redress, compensation or protection from the Industrial Court. Rather, *J v M Ltd*, involved an applicant arguing "unfair dismissal" in relation to being fired for his practice of caressing buttocks and fondling the breasts of female subordinates (Sutherland, 1991: 60). Hence, well over a decade after the United States of America's landmark cases (amongst others *Williams v Saxbe*, *Barnes v Costle*, and *Meritor Savings Bank, FSB v Vinson*)<sup>3</sup>, the Industrial Court in South Africa is yet to hear a case where the applicant is a *victim* of harassment.

### **Definition of Sexual Harassment**

The definition of sexual harassment used in *J v M Ltd* - "unwanted sexual attention in the employment environment" - was broad enough to encompass a range of behaviours:

Conduct which can constitute sexual harassment ranges from innuendo, inappropriate gestures, suggestions or hints or fondling without consent or by force to its worst form, namely rape (*J v M Ltd*, 1989: 757).

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<sup>3</sup> See MacKinnon, 1979: 63 and Dancaster, 1991: 451 for a fuller discussion of these cases.

Further, De Kock, the presiding member of the Court, also identified different forms of sexual harassment:

[I]n its narrowest form sexual harassment occurs when a woman (or a man) is expected to engage in sexual activity in order to obtain or keep employment or obtain promotion or other favourable working conditions. In its wider view it is, however, any unwanted sexual behaviour or comment which has a negative effect on the recipient. (*J v M Ltd*, 1989: 756).

This definition is very similar in scope and nature to the one contained in the Equal Employment Opportunity Commission's (EEOC) *Guidelines on Sexual Harassment*. These guidelines were adopted by the EEOC in 1980 and set out the "legal definition" of sexual harassment in the United States of America (Welzenbach, 1986: 4). The guidelines define sexual harassment as:

Unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature ... when:

- (1) submission to such conduct is made either explicitly or implicitly a term or condition of an individual's employment; or
- (2) submission to or rejection of such conduct by an individual is used as the basis for employment decisions affecting such individual; or
- (3) such conduct has the purpose or effect of unreasonably interfering with an individual's work performance or creating an intimidating, hostile, or offensive working environment. (Welzenbach, 1986: 23).

### *Quid Pro Quo Harassment*

The first two sections of this definition deal with what has become known as *quid pro quo* harassment. This occurs when specific employment opportunities or benefits are withheld as a means of coercing sexual favours. Alternatively, they can be offered as bribes for sexual favours. In other words, an individual in a position of power, either explicitly or implicitly, uses his/her authority to hire,

fire, promote or allocate work to pressurise an employee to engage in sexual activities. These activities can include complying with requests for dates or sex, being touched or fondled, or responding positively to sexual comments and flirtations. (Welzenbach, 1986: 4).

## Environmental Harassment

The last section of the definition deals less explicitly with direct power relationships in employment. It focuses instead on the work environment. If this is made unpleasant or uncomfortable for an employee through the creation or imposition of an inappropriate sexual atmosphere, then it constitutes sexual harassment. This type of harassment, therefore, can include jokes or comments of a sexual nature, unwelcome verbal and/or physical advances, offensive sexual flirtations, graphic comments about an individual's body, sexually degrading words used to describe an individual, and the public display of sexually suggestive objects or pictures. (Welzenbach, 1986: 4).

Three points are emphasised within both the EEOC definition and the one used by De Kock in *J v M Ltd*. Firstly, that acts which constitute sexual harassment are *unwanted* by the recipient of them. Secondly, that they are of a *sexual nature*. Finally, that sexual harassment covers a wide range of activities that may be *either physical or verbal*. There remains, however, an important distinction. In the United States of America, sexual harassment is viewed as a form of unlawful sex discrimination<sup>4</sup>. Under Title VII of the Civil Rights Act (1964) it is an unlawful practice "for an employer to discriminate against applicants or employees on the basis of sex", and, as "by definition, sexual harassment occurs because of the harassed employee's sex" it is unlawful (Welzenbach, 1986: 9). In *J v M Ltd*, however, a much broader conceptual framework is used. It is argued by De Kock

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<sup>4</sup> This is the same position as in Great Britain, Canada and Australia.

that sexual harassment "violate[s] that right to integrity of body and personality which belongs to every person and which is protected in our legal system both criminally and civilly". This is different, although not contradictory, from the view that sexual harassment is a form of sex discrimination. (*J v M Ltd*, 1989: 756).

### **Extent of Sexual Harassment**

The paucity of cases<sup>5</sup> dealt with by the Industrial Court should not be taken as an indication either of a low incidence of sexual harassment in South Africa, or of an absence of employees seeking relief or redress outside of the Industrial Court. What it does suggest is that the lack of a comprehensive legal framework within which to view sexual harassment, and the associated limited legal protection currently offered to employees, compounds the problems faced in both reporting incidents and having them effectively dealt with.

Little research has been undertaken into the question of sexual harassment in South Africa. However, two surveys suggest that the incidence is high: in one case 76 percent (*Financial Mail*, 1990), in the other 67 percent (Meer, 1984) of women respondents reported being harassed at work, or on their way to work. From extensive research in many countries, particularly the United States of America, Canada, Australia and Great Britain there is overwhelming evidence to support the contention that sexual harassment is "widespread and runs throughout the work hierarchy" (Wilson, 1983: 180).

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<sup>5</sup> As of May 1993, the Industrial Court had heard one further case of sexual harassment: *M v Putco Ltd*. It echoed *J v M Ltd* in that the applicant was an employee dismissed for sexual harassment and seeking reinstatement from the Industrial Court. A similar judgement to *J v M Ltd* was handed down. The case was unreported.

There is little reason to suggest that South Africa should be any different. A costly application to the Industrial Court is not engaged in unless the applicant believes there is a fair chance of success. While certainly a part of the applicant's case in *J v M Ltd* rested on technical arguments about company procedure, there is both evidence and suggestion that his behaviour was regarded by himself and some others as acceptable and normal.

As mentioned above, "some 500" of the applicant's work colleagues signed a petition pleading for his reinstatement. The Court dismissed it on the grounds that the employees who signed it "[did] not know the facts" and "natural[ly] ... would have sympathy with the applicant" (*J v M Ltd*, 1989: 761). However, it seems unlikely that the people who signed the petition would have done so without any knowledge of the nature of the accusation against the applicant. For instance, it is implausible to suppose that he would have received the support he did if he had been accused of theft. The implication, therefore, is that sexual harassment in the workplace, even of the nature that the applicant was found guilty of, is regarded as acceptable, or at the very least as a somewhat trivial disciplinary offence. The widespread support that the applicant received may have been instrumental in persuading some of the women in his office that what they had experienced was not serious or offensive, hence encouraging them to sign the petition. Both these factors suggest that sexual harassment in South Africa is both widespread and not treated seriously.

While this remains at the level of speculation, there have been a number of empirical investigations into experiences of sexual harassment. Perhaps the most exhaustive of these was conducted in 1981 in the United States of America by the Merit Systems Protection Board (MSPB). Twenty-three thousand federal government employees were involved in the survey which asked respondents about their experiences of sexual harassment during the previous 2 years (Stanko,

1985: 62). In the survey, sexual harassment was defined as "deliberate or repeated unsolicited verbal comments, gestures or physical contact of a sexual nature that is considered to be unwelcome by the recipient" (*MSPB Report*, 1981: 2, cited in Russell, 1984: 270).

Forty-two percent of women respondents reported having experienced some form of sexual harassment. Of these, 12 percent indicated that they had been victims of "less severe sexual harassment"; which included "unwanted suggestive remarks or gestures, unwanted sexual teasing, jokes, remarks or unwanted pressure for dates". Almost a third (29%) had experienced "unwanted letters, phone calls, or materials of a sexual nature, unwanted touching or pinching, or unwanted pressure for sexual favours" which the MSPB regarded as "severe sexual harassment". One percent of respondents, reported "actual or attempted rape or sexual assault" by colleagues or superiors at the work place. (Stanko, 1985: 62).

In addition, 15 percent of male respondents also reported being sexually harassed at work, a "much higher than ... expected" result. However, it is pointed out that the researchers were "uncertain about whether the men defined the unwanted behaviour they were subjected to in the same way as did the women". (Russell, 1984: 270).

Further, it was indicated by many of the respondents reporting incidents of sexual harassment that these experiences were not isolated:

[W]ith the exception of actual or attempted rape or assault, most of the victims reported experiencing all forms of sexual harassment repeatedly. In addition, many reported experiencing more than one form of sexual harassment. We also found that the incidents of sexual harassment were not just passing events - most lasted more than a week, and many lasted longer than 6 months. Thus, not

only did the sexual harassment occur repeatedly, it was of a relatively long duration as well. (*MSPB Report*, 1981: 5, cited in Russell, 1984: 270).

While the survey focused exclusively on government employees two points suggest that similar results could be expected in the private sector. Firstly, respondents who had worked in this sector previously were asked if in their opinion, and based on their experience, sexual harassment occurred more or less frequently in the public sector. The majority indicated that "sexual harassment was no worse in the Federal workplace than in the private sector" (Russell, 1984: 271). Moreover in the introduction to the report it is argued that because "people of all ages, salary levels, education backgrounds and hometowns are potential victims" it can be observed that "sexual harassment cannot be uniquely associated with Federal employment" (*MSPB Report*, 1981: v, cited in Russell, 1984: 269).

## **Victims and Perpetrators of Sexual Harassment**

### **The Victims**

There is overwhelmingly evidence to suggest that it is men who harass and women who are the victims. Within this general statement, however, it is important not to lose sight of the fact that men can and are harassed, by other men and by women (Wilson, 1983; Russell, 1984, Konrad & Gutek, 1986).

The MSPB survey provides a composite picture of who is harassed and by whom. Age, marital status, and gender composition of the work place were the factors that most influenced the likelihood of harassment. Less emphatic, but none the less important were the level of education, race, "ethnic background", the nature and classification of the job, and the gender of the "immediate supervisor". The report concluded that persons most vulnerable to harassment were "young; not married; [had] a higher education; in a trainee position; in [a] non-traditional

position, for their sex (eg female law enforcement officers, male secretaries); supervised by someone of the opposite sex; [and] in [an] immediate work group composed predominantly of the opposite sex". In addition men who were harassed were likely to be "members of a minority, racial or ethnic group" and in a "office/clerical" position. Apart from this the profile listed above was consistent for both women and men. (*MSPB Report*, 1981: 6, cited in Russell, 1984: 272).

Wilson suggests that while all women are vulnerable to sexual violence, the way in which it is *experienced* is influenced by a number of factors. These include age, class, race, and the degree to which they fit the social stereotype of "attractiveness" (Wilson, 1983: 12). To this list should be added the question of gender. As discussed previously, the way in which men experience sexual harassment (and violence) is likely to differ from that of women.

## The Perpetrators

In looking at the question of "who harasses", the MSPB study concluded that:

[I]t appears that some individuals are more likely to harass than others and that sexual harassment is not necessarily normal interaction among men and women on the job, or that all men and women engage in it as has been intimated by some. (*MSPB Report*, 1981: 10, cited in Russell, 1984: 273).

Individuals who are "more likely to harass than others" are typically "of the opposite sex of the victim; of the same race or ethnic background of the victim; married and older than the victim (if the harasser is a man); divorced or single, and younger than the victim (if the harasser is a woman); [and] a fellow employee or colleague, rather than a supervisor". (Russell, 1984: 272).

This last point was unexpected. Prior to conducting the study, sexual harassment was widely "thought to be perpetuated by the more powerful supervisors against their more vulnerable employees". However, the majority of respondents reported that they had been harassed by co-workers and colleagues and not supervisors. Hence, while "supervisors were found to be personally responsible for a number of sexual harassment incidents" they were "not the principal cause of the problem". (*MSPB Report*, 1981: 10, cited in Russell, 1984: 272).

Finally, it was demonstrated that harassers tended to act alone, rather than in a group, and that he or she often harassed more than one person. The report argued that this latter point "somewhat negate[d] the view that sexual harassment is principally a matter of isolated instances of personal sexual attraction" (Russell, 1984: 273).

## **Understanding Sexual Harassment**

Gruber and Bjorn (1986: 815-816) identify two models to explain sexual harassment. Both models identify disparities in "power and status" between men and women as the central cause of sexual harassment. The sociocultural model suggests that these "culturally legitimated" differences affect how women are viewed in the work place and encourage sexual harassment. The organisational model focuses on how organisational power is distributed in the work place. It is argued that "women as a group have less organisational power than men", and hence are targets for sexual harassment.

### **Organizational Model**

MacKinnon (1979: 9) argues that "the horizontal segregation, vertical stratification, and income inequality of women compared with men in the workforce" makes them vulnerable to experiencing harassment:

Horizontal segregation means that most women perform the jobs they do because of their gender, with the elements of sexuality pervasively implicit. ... Vertical stratification means that women tend to be in low-ranking positions, dependent upon the approval and good will of male superordinates for hiring, retention, and advancement. Being at the mercy of male superiors adds direct economic clout to male sexual demands. Low pay is an index to the foregoing two dimensions. It also deprives women of material security and independence which could help make resistance to unreasonable job pressures practical.

South Africa sharply mirrors the conditions in the United States of America (and elsewhere) that MacKinnon (1979) suggests are at least partly responsible for making women vulnerable to sexual harassment. The participation of women in the formal economy in South Africa has increased over the last two decades, from 41 percent in 1960 to just under 45 percent in 1985 (*South African Labour Statistics*, 1990). However, women have moved into specific sectors and specific jobs within these sectors<sup>6</sup>.

In 1985, almost a quarter (22%) of working - or rather paid - women were employed in private households. Ninety-four percent of domestic workers were women. Almost three quarters (71%) of men were employed in private business, while under half of women (45%) were similarly employed. Over 50 percent of working women were employed in the service and clerical and sales sectors - while under 20 percent of men worked in these occupations. Within this sector, women were clustered in particular job types. Amongst these were secretaries, typists, clerks, receptionists and bank tellers. While there were roughly equal numbers of men and women employed as professional, semi-professional and technical workers, almost three-quarters of women in this sector were nurses or

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<sup>6</sup> See Budlender, 1991 for a fuller examination of the position of women in the South African economy.

primary and secondary school teachers. (*South African Labour Statistics*, 1990). In summary: at a macro-level, there is strong evidence of horizontal clustering, with women typically employed in "women's jobs", that is "in job categories noted for their sex-typing and in workplace settings characterised by sex segregation" (MacKinnon, 1979: 12).

At a micro-level, vertical stratification by gender is also evidenced in the South African workplace. Fewer than 1 percent of the total number of working women in 1985 were employed as managers, executive and administrative workers. Women, particularly black women, were virtually absent from the highest professions in the country. In 1985 women constituted under 10 percent of engineers, architects, advocates and medical specialists in South Africa. (*Manpower Survey*, 1990).

Further, women are overwhelmingly in positions that men "manage, supervise, or administer" (MacKinnon, 1979: 12). For example, in 1985, women constituted 99 percent of people employed as secretaries. In sharp contrast, of the almost 24 thousand chief executives, general managers and company directors, 95 percent were men. Similarly in the public sector, women formed a majority of all workers employed in this area. At more senior levels, however, they were conspicuous by their absence: of the approximately 7 000 executive and managerial positions in the public sector, a little over 300 (4%) were held by women. (*Manpower Survey*, 1990).

The sex-segregation of the labour market, while useful in identifying the disadvantaged and hence vulnerable position of women in the workplace, cannot adequately explain why sexual harassment occurs. It does not, for example, offer an explanation for the finding in the MSPB (1981) survey as to why it is co-workers, rather than supervisors, who are the principal harassers. The

sociocultural model offers some means for addressing this issue, while also exploring the question of why men might use their structural power in the workplace to sexually harass other employees.

### Sociocultural Model

In this model, sexual harassment is viewed as a result of "culturally legitimated power and status differences between men and women". It takes as its starting point that women are accorded less power and status than men within society. A series of "social and cultural arrangements" ensure that women

are continually evaluated in terms of their sexuality; gain their status through men (eg husbands); are accorded little control over their own lives; and are burdened with negative stereotypes which perpetuate the notion of their dependent, childlike nature (Gruber & Bjorn, 1986: 815).

In relation to sexual harassment, it is the power disparity with regard to "sexuality" that is of particular importance. The sexual socialisation of both men and women has ensured that men have "traditionally enjoyed the prerogative of sexual initiative" (Russell, 1984: 274). Men are encouraged "to desire and pursue sexual relationships with many women, and men who are successful in so doing are often admired by other men" (Konrad & Gutek, 1986: 423). Moreover "males are trained from childhood to separate sexual desire from caring, respecting, liking or loving" (Russell, 1984: 122).

In contrast, women are socialised to integrate sex, affection, love and commitment. They are encouraged to be sexually passive, and discouraged from expressing their sexuality outside of a structured relationship, preferably marriage, in which the women's fidelity to her partner is of prime importance. If men gain status through sexual conquest - a status dependent on avoiding commitment to a

single partner - women's status comes through being considered attractive and sought after by men, and ultimately in securing or trapping a long-term partner. This has resulted in women being evaluated primarily in terms of their sexual desirability, or by sexual stereotypes. (Stanko, 1985: 135).

All of these practices have particular consequences for women in the work place. Women can, and many do, find it difficult to be taken seriously in the work place as their primary evaluation in terms of their sexuality often means they are viewed "as sexual beings first, and as breadwinners second" (Russell, 1984: 274). Stanko (1985: 66) argues that this encourages other sexual stereotypes of women:

Perhaps most frustrating for harassed women is that they confront the stereotypes ... (that) either women are 'cows' (sexually unco-operative) or 'whores' (sexually co-operative). Either way women are not in control of stereotypes used against them, stereotypes which revolve around women's sexuality.

Two other stereotypes are identified by Stanko (1985: 66). The first is that "working women are "available" to their male counterparts for sexual use". She is supported in this view by Konrad and Gutek's (1986: 423) finding that men tend to view the workplace as "a potential arena for sexual conquest" and that they are encouraged both to pursue and initiate sexual relations with women. These factors contribute to making women workers vulnerable to sexual harassment and coercion.

"Women sleep their way to the top" is the second stereotype about women in the work place identified by Stanko (1985: 67). While this stereotype supports the contention that women in the work place are evaluated as "women" rather than "workers" or "professionals", it also demonstrates the double standards that operate in relation to men's and women's sexuality. Konrad and Gutek (1986:

423) found that "while sexual liaisons with co-workers ... enhance a man's status in the work organization ... such liaisons ... degrade a woman's status". Hence it is suggested that men will more often seek sexual liaisons in the work place than women, again making women, rather than men, more vulnerable to sexual harassment.

The sociocultural model, while identifying important aspects of sexual harassment, fails to adequately explain the whole. For instance, the sociocultural model cannot account for the fact that some men are harassed by women. However, both the sociocultural and organisation models, identify key components of sexual harassment. The sociocultural model points to the need to understand the way in which gender power imbalances, particularly in relation to sexuality, impacts on structural relations in the workplace. If this is taken into account, an explanation may be found for co-worker harassment. Similarly, the organisational model, by stressing the importance of the unequal distribution of structural power within employment institutions, provides one hypothesis of women harassing men: as increasing numbers of women gain structural power within employment organisations, so too do they gain the power to sexually harass. Hence, the two models combined provide a more useful analysis of sexual harassment.

### **Sexual Harassment as a Social Construct**

The universality and pervasiveness of sexism and sexist attitudes makes challenging the inferior position of, and sexist attitudes towards, women in the workplace (and more broadly) extremely difficult. Gendered socialisation allows (and encourages) sexism to be viewed, not as a socially constructed system of domination and oppression, but rather as a natural ordering of the ways things "ought to be" (Poynton, 1985: 3). At the University of Cape Town (UCT), the Equal Opportunity Research Project (EORP) undertook a study into employment

equity at the university. In discussion forums of academic and administrative staff members the significant underrepresentation of women in senior positions in the university was frequently dismissed as unimportant. "It's not discrimination, it's just the way things are" and "UCT is making a big issue out of nothing. This focus on sexism is just silly" were two comments made by participants (Sutherland & Ramphela, 1993: 54).

Similarly, one of the greatest problems associated with sexual harassment in the workplace is its acceptance by both men and women, perpetrators and victims, as either "natural", or at most a trivial disciplinary offence. The following comment from a trade union organiser in the United Kingdom aptly captures this point: "They'll have a hard time legislating against human nature" (Stanko, 1985: 139).

The sociocultural model is particularly useful in explaining why the harassment of women in the workplace is often accepted as a "normal" way of behaving. Socialised patterns of behaviour between men and women in society tend to be perceived as "natural" or "self-evident" ways of interacting. Wilson argues that it is these patterns that are reflected in the workplace, and hence accepted:

It has become clear to the feminist trade unionists now campaigning around the issues [of sexual harassment] that one problem is that much of the male behaviour that becomes harassment in the workplace is the same as the behaviour many women regard as normal and which men dish out as normal in the home (Wilson, 1983: 175).

Lacey (1993: 1) echoes this argument in asserting that the "emergence of the idea of sexual harassment as an abuse of women" is a "remarkable cultural change". She suggests that "in a gradual process ... practices which twenty years ago would have passed as trivial or even 'chivalrous' have been *reconstructed* as demeaning

to women and inconsistent with [women's] full status as citizens [and] as workers"<sup>7</sup>. Implicit within this notion, that particular sexual acts can be imbued with new meaning, is that "sex" is a social construct:

"Sex" that is simply biological or "natural" has little to do with what human beings experience since their conduct is always embedded in their culture, with its own historically produced set of symbols and meanings (Plummer, 1984: 38).

These "symbols and meanings" define or signal what is acceptable or unacceptable sexual behaviour. Behaviour which falls outside of these socially determined boundaries is labelled as deviant or criminal. What sexual acts can be engaged in, with whom, and where, are socially defined and determined. For instance, sodomy, incest, bestiality and sex in public are examples (albeit extreme ones) of sexual acts or relations, which do occur, but which tend to fall outside of socially acceptable boundaries. Social censure to ensure adherence to these social norms and values include both informal (for example, social ostracism) and formal (for example, prison) means.

Definitions of what constitutes acceptable sexual behaviour can and do change over time: unacceptable sexual behaviour can come to be viewed as acceptable, and vice-versa. In many countries homosexuality, once regarded as "unnatural", is increasingly being viewed simply as an expression of human sexuality. In others, it remains both unlawful and socially deviant - demonstrating the extent to which acceptable sexual behaviour is culturally specific. Conversely, as discussed above, unwanted sexual attention in the workplace, once regarded as "normal", is increasingly being labelled as unacceptable.

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<sup>7</sup> Own emphasis.

Lacey (1993: 1) argues that "political campaigns, consciousness-raising, legal strategies and personal struggles have each played a part" in gaining this shift in perception. The exposure of "one of the most pervasive but carefully ignored" (Emerson, 1979: vii) experience of working women - that of unwanted sexual attention in the workplace - was linked both to the increasing number of middle-class women entering the workforce, and the rise of feminist politics.

One of the major contributions made by feminist scholars was to distinguish between the concepts of "gender" and "sex". Sexual differences, the "basic and unchangeable biological" differences between males and females, are unchangeable. Gender roles and relationships, on the other hand, are the "socially learnt" roles and interactions that we learn are appropriate for "men" and "women". They are "reinforced and modified by the economic, political and cultural environment in which we live" (Ramphela & Boonzaier, 1988: 154). Moreover, and more importantly, as "learned" roles, they can be challenged and changed.

In general, however, gender roles continue to be simply accepted, with no awareness of the extent to which socialising agencies such as the family, school, religious institutions and the media, have created and reinforced them. In part this is because socialisation is "not a conscious moulding of individuals into ... preconceived categories. Rather, it is "mediated, or masked by ideology" (Poynton, 1985: 17).

Ideology can be defined most simply as "a systematic body of ideas, organized from a particular point of view". Poynton (1985: 18) argues that "ideological meanings" or labels (such "woman" or "man") arise out of "particular power configurations":

But rather than being separable from the society that has produced them, they mirror that society back to itself in such a way as to reinforce its own identity. In other words, they constitute both the reality and the theory of reality of a society.

It is only when the "power-configuration" within a society or social system is challenged that "ideology becomes visible as ideology, rather than being invisible, as the everyday and unchallenged pattern of meanings of a particular society" (Poynton, 1985: 18). The feminist movement challenged from within the power-configuration of patriarchy. By exploring and challenging the position and status of women, and the relationship between women and men, feminists made visible the ideological process of gender socialisation by demonstrating that the apparently biologically based category of "gender" was a source of ideology rather than a natural self-evident given.

The extent to which feminists were challenging an essentially "invisible" process can perhaps best be demonstrated by the fact that no words existed to name the processes they were identifying and challenging. "Sexism" and "male chauvinism" are two such examples. In addition, words such as "gender", "patriarchy" and "feminism" had to be infused with "new meanings" (Poynton, 1985: 4). Similarly, with regard to sexual harassment, Stanko (1985: 61) argues that "at least until 1976, no one had a name for this collective experience".

This is not to suggest that there now exists a consensus on what behaviour constitutes "sexual harassment". On the contrary, it is precisely a lack of consensus that is one of the greatest problems associated with dealing with sexual harassment in the workplace. "*Sexual harassment - some see it - some won't*" (Collins & Blodgett, 1981), the provocative title of an article on a survey of attitudes towards sexual harassment, perhaps best captures one of the fundamental reasons for the continued disagreement.

Not surprisingly, Konrad and Gutek (1986: 437) found that "women were significantly more likely than men to label sexual behaviors at work as sexual harassment". Within this general pattern there were also other discernable trends, influenced primarily by specific working conditions. Men in gender-integrated workplaces were "more likely than other men to label sexual behaviors as sexual harassment". In addition, they concluded that "women in female-dominated jobs who interact with adult men a great deal during the course of the workday label fewer behaviors sexual harassment than other women". This is despite (or perhaps because of) evidence to suggest that it is this group of workers that experience a higher level of sexual harassment than other group.

This is a point well demonstrated in *J v M Ltd*. In his defence at the company hearing the applicant claimed that the women who received his attention both wanted it, and to some extent sought it:

You know if we go from here down there [presumably the office] I can count them here [probably a reference to his hands] the girls that I have not touched, not that I wanted to brag about it but I am going to say about this that when I don't feel their buns they seem to complain and say what is wrong with you. (*J v M Ltd*, 1989: 759).

He maintained this despite empirical evidence to the contrary as there were complaints and resignations over his behaviour from the time that he arrived at the company. Further, the applicant argued that his behaviour should be viewed in a culturally specific context, suggesting that it was no more than "mildly flirtatious or *mediterranean*" type behaviour<sup>8</sup>. Such an argument is premised on the notion

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<sup>8</sup> Own emphasis.

that in particular cultures, physical and intimate touching are acceptable. In giving judgement against the senior executive, De Kock similarly draws on a culture-specific argument. However, he does this to refute the claims made by the applicant:

This case concerns relations between people who belong to the Western culture. In Western culture one expects gentlemanly conduct. Sexual harassment is unacceptable at any level in Western society. No warning or counselling is required and certainly not at senior management level. (*J v M Ltd*, 1989: 761).

Here, "gentlemanly conduct", is meant to signify conduct which excludes sexual harassment as an appropriate way of behaving towards women. It is particularly problematic therefore that De Kock implies that this is exclusive to "Western culture". Moreover, what makes the above argument the more surprising is that prior to this he states that "sexual harassment ... violates that right to integrity of the body and personality which belongs to every person" (*J v M Ltd*, 1989: 761). The two approaches would appear to be mutually exclusive: it is contradictory to assert universal values on the hand, and then to claim them back again through a culturally specific argument. Finally, to suggest that the Industrial Court should be reluctant to intrude into the cultural integrity of people not part of "Western culture" is to elevate a false notion of "culture" to unacceptable levels.

The above demonstrates the extent to which sexual behaviour and hence sexual harassment is a social construct - and a construct over which there is little agreement on boundaries. Finally, it suggests that the difficulties in undertaking research, or developing policies against sexual harassment, will be compounded in multi-cultural contexts.

## **Sexual Harassment in Universities**

In educational institutions, such as universities, there are a range of structural hierarchies. Beyond the employer / employee hierarchies that exist in almost all workplaces, the relationship between teachers and students is one in which there is also a structural imbalance of power. The obvious power differential between faculty members and students involves the authority that a teacher has to determine whether a student passes or fails a particular course, and with what grade. There are also a host of other material resources which faculty members have control over: access to courses, particularly to post-graduate studies; the writing of references for jobs and scholarships; participation in particular research projects and so on. In these respects the relationship between faculty and students parallels that of employer and employee, although the currency of the power differential in the latter is economic rather than educational.

Further, the relationship between professor and student also involves less tangible factors which are important to the educational process itself. As discussed previously, the "learning process" involves "dependence and trust", which is quite different from the almost exclusively economic relationship between an employer and employee (Dean's advisory committee on grievance procedure at Yale, 1977, cited in Paludi, 1990: 5). In addition, the power imbalance inherent in a teacher-student relationship is often further exacerbated by the age differentials between students and teachers.

Ensuring that academic staff members do not use their structural power to exploit students to their own benefit is becoming an increasingly important aspect of university management. One of the ways in which this is achieved is through the adoption of policies and procedures to define and regulate appropriate behaviour between staff and students, particularly with regard to sexual harassment.

In general, most policies and research into sexual harassment at universities have focused on the relationship between students and faculty members. However, as has been demonstrated by examining the relationship between co-workers, sexual harassment can occur in a context in which there are no structural or organisational power imbalances. I have argued that the reasons for this lie in broader gender hierarchies, particularly with regard to sexuality. What this suggests is that while all students have less power than faculty members at a university, that this does not make them equal: more simply, that there are hierarchies within the student body. These may take a range of different forms. At a structural level, post-graduate students have greater authority and power than undergraduate students, particularly first-year students. Similarly, gender and race hierarchies, apparent in all spheres of society, need to be taken into account in understanding divisions within a student body at a university. In particular, attention needs to be paid to the way in which these divisions can be exploited by some students, to their own benefit.

Appreciating the ways in which social relations between students either foster or prevent students' participation in the academic and social life of a university is beginning to be recognised as an important aspect a university's responsibility towards students. The emphasis of the work of the Committee of Enquiry into Sexual Harassment at the University of Cape Town was on this aspect of sexual harassment. The focus on relationships between students provided particular challenges that we had to address in the design and implementation of our research approach. While some of these challenges related to undertaking research into sexual harassment more generally, (which allowed us to draw on the experiences of researchers elsewhere), some were unique to the emphasis that we chose to adopt. The following chapter examines the more general problems posed by undertaking research into sexual harassment, while Chapter Five examines the particular problems we had to overcome at the University of Cape Town.

## **Conclusion**

I have argued in this chapter that sexual harassment is a pervasive social problem, faced primarily but not exclusively by women. I have pointed to gender hierarchies, both social and organisational, that exist both inside and outside of the workplace, as the cause of sexual harassment. With regard to sexual harassment in educational institutions, I have suggested that the relationship between student and teacher mirrors that of employer and employee. Further, I have argued that social relations between students at university are not equal, but are affected by social hierarchies based on, for example, gender and race.

I have argued that sexual behaviour and hence sexual harassment is a social construct. Moreover, it remains a construct over which there is little agreement as to where to draw the boundaries. Finally, I have suggested that sexist ideology masks the reality of sexual harassment which makes the process of addressing it in the workplace and elsewhere complex and difficult. This latter point also raises the question of how best to undertake research into sexual harassment. The following chapter addresses this question.

## *Chapter Three*

# **RESEARCH CHALLENGES POSED BY SEXUAL HARASSMENT**

In addition to being victims of the practice, working women have been subject to the social failure to recognize sexual harassment as abuse at all. Tacitly, it has been both acceptable and taboo; acceptable for men to do, taboo for women to confront, even to themselves. But the systematic silence enforced by employment sanctions is beginning to be broken. [Sexual harassment] ... is beginning to be explored, documented, and, increasingly, resisted. (MacKinnon, 1979: 1).

In this chapter I identify some of the key problems involved in undertaking research into sexual harassment. I will suggest that there are particular problems associated with the labelling of sexual behaviours as sexual harassment that need to be taken into account in developing research programmes. I also look at the problems of undertaking research into a social concept in the absence of a widely accepted definition of it. I will argue that the questions of breadth and variety of experiences covered by the label "sexual harassment" are two factors which have complicated the achievement of such a definition. Finally, I look at the question of legislative or regulatory definitions of sexual harassment, and the problems that have arisen from using these definitions for research purposes.

### **Sexual Harassment Reporting Rates**

One of the greatest problems associated with sexual harassment is the silence that surrounds it. In the previous chapter I argued that "a series of social and cultural arrangements" have allowed damaging and abusive practices such as sexual harassment to either be denied, or viewed as trivial, unimportant matters (Gruber & Bjorn, 1986: 815). One of the consequences of this is that inappropriate sexual behaviour is frequently not labelled as harassment, and hence goes unreported and

unchallenged. Similarly, the fact that sexually harassing behaviour is frequently not labelled as such poses particular challenges in undertaking research into sexual harassment, particularly in terms of measuring the extent and nature of sexual harassment.

In the 1981 Merit Systems Protection Board (MSPB) study it was found that while 42 percent of women had experienced some form of sexual harassment over a two year period, "only about 11 percent of victims reported the harassment to a higher authority, and only 2,5 percent used formal complaint channels" (Russell, 1984: 272). In other words, almost 90 percent of incidents went unreported, and almost 98 percent of cases did not result in disciplinary proceedings. A similar picture is revealed in relation to sexual harassment in a university environment. Studies in the United States of America suggest that while 20 to 30 percent of female college students experience sexual harassment during their time at college, academic institutions averaged only about 4 complaints a year (Robertson, Dyer & Campbell, 1988: 792 - 812, cited in Riger, 1992: 43).

Other acts of sexual violence, such as rape, also have very low reporting rates. In South Africa it is estimated that between 1 in 4 and 1 in 10 rapes are reported<sup>1</sup>. Fear of not being believed, fear of victimisation, and fear of the disciplinary process involved, are some of the reasons for the low reporting rate of sexual violence (Rape, 1989; Vogelman, 1990: 61-68). Underpinning many of these fears are a number of "rape myths". These are false accounts of what rape is and why it happens. While these myths "do not approximate reality ... [t]heir widespread internalisation decreases social censure for rape". (Vogelman, 1990: 61).

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<sup>1</sup> These are estimates based on international and South African statistics, and personal communication with counsellors in Rape Crisis and the National Institute for Criminal Rehabilitation (NICRO), Cape Town. See also Russell, 1984: 31 and Vogelman, 1990: 1.

One of the most disturbing aspects of the case *J v M Ltd* (1989) is the extent to which employees were willing to defend the applicant, as demonstrated by the two petitions referred to previously. Some of the factors associated with the low reporting rate of rape may go some way to explaining why a perpetrator of sexual harassment received the support he did, both from colleagues and victims. In testifying against the Equal Rights Amendment (ERA) clause before a United States of America Senate Committee, Phyllis Schlafly (an anti-ERA campaigner) stated:

Sexual harassment on the job is not a problem for virtuous women, except in the rarest of cases. Men hardly ever ask sexual favours from women from whom the certain answer is no. Virtuous women are seldom accosted. (Cited in Stanko, 1985: 139).

Such an attitude suggests that reported cases of sexual harassment reflect as much on the morality of the victim, if not more, than on the perpetrator. It echoes the widespread notion that "nice girls don't get raped", or more lucidly, that women provoke sexual attacks or unwanted sexual attention through their dress, flirtatious behaviour or other actions (Vogelman, 1990: 67). Moreover, if it is believed that victims are to blame for sexual harassing behaviour, then it is only a short step to believe that they are also undeserving of sympathy and protection. Such an attitude, will not only have an inhibiting factor on reporting incidents, but could also go some way to explaining why there was such sympathy for the manager in *J v M Ltd*.

Implicit within the above point is a belief that women are somehow responsible for men's sexuality and their sexual actions. In one of the most widely held misperceptions about sexual violence, men are viewed not only as sexual initiators, but as sexual aggressors, unable to maintain their self-control in the face

of sexually provocative behaviour. Women, in turn, are seen to be sexually passive, and are expected to prevent this from happening by ensuring that they behave in a manner that encourages men to remain in control of themselves. Hence, women are expected to constantly monitor their behaviour in terms of how they dress, speak and move, and where they go and when. (Vogelman, 1990: 66).

In *J v M Ltd*, at the company disciplinary hearing preceding the Court case, the applicant asked one of the complainants why she had not "told him to stop", if she found his behaviour offensive. She replied that:

I never wanted to be rude and I never wanted to tell you basically to 'F' off. I have tried not to be rude and I have tried to show my displeasure by pulling back because in your senior position I did not want to cause any embarrassment or any ill feeling ... perhaps I have not been strong enough in my objections. (*J v M Ltd*, 1989: 760).

Implicit within both the question and the answer provided ("perhaps I have not been strong enough in my objections") is the suggestion that the victims of his attention were at least partially responsible for his behaviour. The complainant's response contains an understanding of how her harasser's structural position of power limited the options available to her for signalling her objections. However, the concern of the complainant "not ... to cause any embarrassment or any ill feeling" also illustrates her continued concern for the applicant, and in turn her feeling of partial responsibility, as the question, embarrassment to whom, demonstrates.

All of these factors illustrate the difficulties associated with reporting sexual harassment, and indicate a need for clear and explicit guidelines on what

constitutes sexual harassment, why it is wrong and how victims can and should challenge and report it when it occurs. In the absence of such guidelines, and in the context of the widespread support the applicant received from other employees, it is not surprising to find in *J v M Ltd* that the prime complainant withdrew her charge of sexual harassment. What is surprising is that it was made in the first place.

In conducting research into sexual harassment, many of these issues similarly need to be taken into account in the design of research programmes. Finding ways to overcome subjects' unwillingness or inability to label experiences as "sexual harassment" is one of the major challenges posed by research into sexual harassment. One of the factors which exacerbates this problem is the definition of the concept itself.

### **Problems with Definitions**

At its simplest, sexual harassment can be defined as "unwanted, inappropriate and often persistent sexually oriented behaviour". However, such a definition is so broad as to allow scope for ambiguity. Lacey (1993: 2) argues that early "feminist campaigns" to address sexual harassment may have been able to take advantage of this ambiguity as in the absence of a clear and explicit definition, employees, but particularly men, were forced to look critically at behaviour that had previously been "taken for granted". However, she suggests that "as soon as one moves from the process of consciousness-raising to that of regulation ... definitional ambiguity raises serious questions". Her point, raised in the context of discussing legal strategies to address sexual harassment, could well be applied to undertaking research into sexual harassment.

Fitzgerald (1990: 21) concurs, suggesting that "one of the most persistent and troubling problems in the sexual harassment literature has been the lack of a

widely agreed upon definition of the concept". She identifies as the central problem the need to have a definition that is "*broad* enough to comprehend the *variety* of experiences to which the construct refers, and yet specific enough to be of practical use"<sup>2</sup>. I would like to take the inter-related issues of breadth and variety and use them to explore the concept of sexual harassment.

## Breadth

The scope of behaviours encompassed by definitions of sexual harassment range from "innuendo ... to it's worst form, namely rape" (*J v M Ltd* 1989: 757). In my opinion, this approach attempts to do too much and, paradoxically in striving to do this, achieves too little. It is difficult to imagine, for instance, a definition of racial harassment attempting to include a range of behaviours from racial slurs to lynching - arguably the worst form of racial harassment. While conceivably a murder motivated by racial hatred is a form of racial harassment (albeit an extreme one), it is unlikely that the term would be used. Indeed, many people would find it offensive that the brutality inherent in this crime should be labelled as harassment. And yet, seldom is it questioned as to why rape is included in the range of behaviours covered by sexual harassment.

Similarly, I would regard actions that include the use of physical violence to be inappropriate when speaking of "harassment". To return to the analogy with racial harassment, it is unlikely that if a white employee beat up a black colleague that the perpetrator would be labelled as a "harasser", or that disciplinary proceedings would be instituted on the grounds of "racial harassment". It is far more likely that criminal actions would be instituted for "assault", with the implicit understanding that the racial nature of the assault is a relevant factor in

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<sup>2</sup> Own emphasis.

dealing with it. Even if criminal actions were not instituted, it is unlikely that the action would be labelled as "harassment" by the participants or observers.

What is called for is a distinction between "sexual harassment" and "sexual violence". Rape, battery and assault, whether they occur inside or outside of the workplace, are acts of violence. Moreover, the juxtaposition of sexual violence and less serious forms of exploitation and abuse may well have the effect of inhibiting the labelling of these latter actions as harassment.

One of the most influential investigations into sexual harassment (Till, 1980) was conducted under the auspices of the National Advisory Council on Women's Educational Programmes in the United States of America in 1980<sup>3</sup>. A "national sample of college women" was asked if they had ever been harassed, and if so, to detail their experiences. The responses were then classified into "five general categories, covering a wide spectrum of behaviors from sexist comments to rape". The five categories, "in a roughly hierarchical continuum", were:

#### **Generalised Sexist Remarks and Behaviour**

This category covered behaviour that was "not necessarily designed to elicit sexual cooperation, but rather to convey insulting, degrading, or sexist attitudes about women".

#### **Inappropriate and offensive, but essentially sanction-free sexual advances**

In other words, behaviour in which there was "no penalty attached to the woman's negative response".

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<sup>3</sup> This study is extensively discussed in Fitzgerald, 1990: 26-27.

### Solicitation of sexual activity or other sex-related behavior by promise of reward

This is *quid pro quo* harassment, in which bribery is used to gain sexual favours.

### Coercion of sexual activity by threat of punishment

This is *quid pro quo* harassment, in which work-related threats are used to achieve compliance.

### Sexual crimes and misdemeanors

These included sexual assault and rape. (Till, 1980, cited in Fitzgerald 1990: 27).

Fitzgerald (1990: 27) in a review of studies into attitudes towards sexual harassment, concluded that "the more coercive *quid pro quo* behaviors are always seen as harassment, whereas *gender harassment*, and *seductive behaviour* (the first and second categories [of the above] typology) elicit much less agreement". In support of her argument she cites a study by Reilly, Carpenter, Dull and Bartlett (1982). In a study looking at cases involving female students and male faculty members, they found that a range of factors affected what behaviours respondents would label as harassment.

Factors which inhibited the labelling of behaviour as sexual harassment included the "nature of the past relationship" (for example, if the people involved were "close friends" or had been "dating regularly") and the "female student action" (for example, if she used "suggestive language" or "said she would do anything for a grade").

Factors which raised the rating in terms of labelling particular behaviour as sexual harassment focussed primarily on the verbal or physical actions of the faculty member. Verbal behaviour which raised the ratings included work related

comments (for example, "he remarked on her progress in class") and direct personal comments (such as, "he admired her hair").

However, the examples used in the study that overwhelmingly raised the rating of the behaviour as sexual harassment involved the use of physical force. Whereas the verbal behaviour of the instructor did not raise the rating by a higher regression rate than 0.94, forceful physical actions raised the regression rate significantly: squeezing her waist (1.13); fondling and kissing her (1.82); attempting sex (3.13); and forcing her down (3.16)<sup>4</sup>.

The use of a single label to describe behaviour which ranges from "sexist comments to rape" may well be one of the central reasons for the lack of consensus over what constitutes sexual harassment. While this remains at the level of speculation, few would disagree that the breadth of behaviours referred to compounds the problems in achieving "a generalized, shared and social definition" (MacKinnon, 1979: 27) of sexual harassment.

### Variety of Experiences

Crull argues that women in "nontraditional" workplaces experience different forms of sexual harassment from women in "traditional" workplaces. Nontraditional occupations were defined as jobs which were "typically held by men ... because the work is seen as more suitable to men than women" (1992: 109). They included occupations such as engineers, surgeons, and construction workers. Crull found that the different experiences of sexual harassment in traditional and non-traditional occupations tended to correspond with the two different forms of sexual harassment identified in almost all regulatory definitions, namely "environmental harassment" and "*quid pro quo* harassment". Further,

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<sup>4</sup> This study is discussed in Fitzgerald, 1990: 27 - 29.

through her analysis it becomes clear that there are some important distinctions between environmental and *quid pro quo* harassment that complicate the achievement of a "widely agreed upon definition of sexual harassment".

In her study Crull found that the most frequently experienced forms of harassment of women in nontraditional workplaces included "sexual taunts, touching, jokes and language directed at the women" by co-workers, rather than bosses or supervisors. Often the behavior was accompanied by "comments about the inappropriateness of having women in those particular occupations". In some instances it was found that the women were deliberately put in danger "by the irresponsible or menacing behavior on the part of co-workers". The effect of this harassment was to make it "difficult" for the women concerned to "learn or perform [their] job duties". At times, the harassment was so "pervasive or embarrassing or even frightening" that the women concerned were forced to leave their jobs. (1992: 109).

There are some key differences between this form of sexual harassment and *quid pro quo* harassment. Crull argues that the form of harassment, the "power configurations" involved, and the "motivations for the harassment" differ between *quid pro quo* and environmental or "atmosphere" harassment<sup>5</sup>. *Quid pro quo* harassment involves individual, personal requests for sexual favours. As is demonstrated by *J v M Ltd*, while the person doing the harassment might be forcing himself on more than one employee, it is essentially an experience between two people, most often conducted in private. In contrast, environmental harassment is most often conducted in public, and involves groups of men acting in concert with one another. Indeed, frequently such harassment is dismissed as

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<sup>5</sup> See Crull, 1987 for further details of this argument.

"kidding and horseplay" on the part of men "unaccustomed to having women around". (1992: 111).

Of greater significance than the public vs private nature of *quid pro quo* and environmental harassment is the different power configurations. *Quid pro quo* harassment almost invariably involves a situation in which there is difference in structural power relations between the harasser and victim. A necessary component of *quid pro quo* harassment is that the harasser must have something to bargain with. Control over access to, progress within, and conditions at, the workplace are powerful currencies in this regard.

Environmental harassment is not dependent on structural power relations. While it may be present in more subtle forms (for instance, women in nontraditional fields will be at a structural disadvantage with regard to any seniority system) most often the power to harass comes from numbers rather than from formal or structural power. Environmental cases most often involve groups of co-workers or colleagues, banding together to send out a message to perceived outsiders: "you don't belong here, we don't want you, get back in your place".

Finally, Crull speculates that "the motivations for the two types of harassment may be different". As alluded to above, environmental harassment "does not start out as a sexual come-on ... it starts out as a sexual challenge or hostile gesture". Whatever actions are engaged in (Crull cites as examples from actual cases, putting up pin-up calendars, calling female workers sexually explicit and embarrassing names, men dropping their draws in front of women colleagues) the point of them is "to remind the woman that the very act of her being in the job is a threat to male co-workers' power and status".

She suggests two reasons that men engaging in this form of behaviour might find women in nontraditional fields threatening. The first is that they challenge the premise on which sex-segregation in the workplace occurs, for their very presence undermines the notion that some jobs are only suitable for men. Further, traditionally jobs reserved for men are "higher paying than comparable jobs for women". Moreover, it has been shown that as large numbers of women move into male dominated professions the status and economic reward associated with these jobs are lowered (Crull, 1987). Hence, the women represent, in material terms, a considerable threat to the men. Secondly, women in non-traditional jobs also challenge the notion of male and female roles: in these jobs the women "are not playing a female role to the man's male role at work; they are also stepping out of their sex roles and working in a male role beside the men in the same positions". Crull concludes from this that the "hostile sexual behaviour" implicit in environmental harassment of women in nontraditional workplaces "can be seen as a way to drive [women] from jobs where they will supposedly take money and status away from the males who formerly predominated and to push them back into their place in terms of sex roles". (Crull, 1992: 111).

The dynamics involved in *quid pro quo* harassment differ from this. Gutek points to "sex-role spillover" as the root cause of *quid pro quo* harassment. Sex-role spillover occurs when women in the workplace are treated, not as workers, but as women in a social situation (Gutek, 1985, cited in Crull, 1992: 110). However, in a purely social setting there is greater scope for rejection of sexual advances. The options open to women treated in this manner in the workplace are limited by the economic power and workplace authority of their boss or supervisor. As MacKinnon argues, "central to the concept [of sexual harassment] is the use of power derived from one social sphere to lever benefits or impose deprivations in another. When one is sexual, the other material, the cumulative sanction is particularly potent". (MacKinnon, 1979: 9). Crull argues that the

assumption underpinning *quid pro quo* harassment is that the harasser has "a right to more than just work from the woman" (1992: 110). Such an assumption could only proceed from the belief, discussed in the previous chapter, that "sexualization is part of the job", and is absent in most cases of environmental harassment (MacKinnon, 1979: 18). It is when the women worker refuses to "play the game" that the harasser "exerts his power and threatens her job" (MacKinnon, 1979: 9).

While there are parts of this analysis that could well be applied to environmental harassment (for instance, in environmental harassment the women are also viewed first and foremost as women, rather than workers) there are also important distinctions. These distinctions are recognised in the qualifying labels (*quid pro quo* and environmental) attached to these different forms of sexual harassment. Including different forms of abusive behaviour, under a single label, complicates the development of an accessible definition of harassment, that is "specific enough to be of practical use", both for legislative and research purposes (Fitzgerald, 1990: 21).

### **Legislative Influences**

Lacey (1993: 1) argues that "lawyers have always been at the centre of ... developments" around sexual harassment. Lacey, a lawyer, might be guilty of an overstatement, but the general point that she makes is valid. The "short history" of sexual harassment is one that has been driven primarily by legislative considerations. MacKinnon's (1979) classic text, more than a decade later, remains the most influential in the field of sexual harassment. The central argument in her book is a legal one: "that sexual harassment of women at work is sex discrimination in employment", and her analysis of a pervasive social problem is moulded around this consideration.

As such, it has been regulatory rather than theoretical definitions of sexual harassment that have dominated the currently available literature. Fitzgerald (1990: 23) lists what she regards as "the most well known and influential examples of *a priori* definitions" of sexual harassment:

Sexual harassment ... refers to the unwanted imposition of sexual requirements in the context of a relationship of unequal power. Central to the concept is the use of power derived from one social sphere to lever benefits or impose deprivations in another. ... When one is sexual, the other material, the cumulative sanction is particularly potent. (MacKinnon, 1979).

Sexual harassment is broader than sexual coercion ... (and) can only be understood as the confluence of authority relations *and* sexual interest in a society stratified by gender. (Till, 1980).

[S]exual harassment is defined as any action within the workplace whereby women are treated as objects of the male sexual prerogative. (LaFontaine & Tredeau, 1986).

Sexual harassment is ... unsolicited male behavior that asserts a woman's sex role over her function as worker. (Farley, 1978).

The extent to which all of these are influenced by regulatory concerns is demonstrated by the emphasis all of them place on context. Each of them, implicitly or explicitly, define sexual harassment as a form of behaviour in a particular and specific situation, namely the workplace. Excluded from the boundaries of these definitions are behaviours, which in form may be exactly the same, but which take place outside of this setting. To give a concrete example: under Farley's definition, if a women worker was to be subjected by a male supervisor to sexual touching or comments about her appearance on the factory floor, this would constitute sexual harassment. However, if these same actions were to take place between two people in the local pub, it would not. As referred

to previously, it is exactly this point that Wilson makes when arguing that "much of the male behaviour that becomes harassment in the workplace is the same as the behaviour many women regard as normal and which men dish out as normal in the home" (1983: 175). To this could be added "in the street, in pubs and in other public places, to women that they do not know". If the above definitions are accepted as the "boundary setters" of what behaviour constitutes sexual harassment, then these actions would have no label, despite quite clearly being "unwanted sexual attention".

Regulating, and indeed criminalising, "unwanted sexual attention" demands that boundaries be assigned to context. The normative arguments that underpin legislation against sexual harassment demonstrates this: in the United States of America, Canada, Australia and Great Britain, sexual harassment is essentially viewed as "an abuse of power which is inconsistent with its object's dignity and equal participation" (Lacey, 1993: 4). "Abuse of power" (what power?) and "equal participation" (in what?) signal the need for a context, and more specifically a context stratified by formal power imbalances. The two spheres most commonly addressed in legislation against sexual harassment are employment and education - spheres in which structural power hierarchies are particularly apparent.

But sexual harassment is about a very specific form of power abuse and exploitation. The history of sexual harassment is one in which,

... a gradual change of attitude [has come about] from the realisation that, given the hierarchical power relations based on gender which are implicit in general sexual relations, and which are exacerbated by gender hierarchies in most work-places and other

institutions, *behaviour which would not be problematic in the absence of those power relations* could indeed become oppressive<sup>6</sup>. (Lacey, 1993: 2).

Hence, for Lacey, an essential component of sexual harassment is the presence of both structural and social forms of power imbalances. At one level this is an entirely legitimate prerequisite. To recall the example used in relation to Farley's (1978) definition of sexual harassment: one of the key differences between the two situations discussed (one work related, one social) is that in the former, rejection of the sexual advances made is complicated, indeed limited, by the potential for economic or employment related retaliation. In the latter, involving the same actions in a local pub, the woman concerned would not be so constrained. She could, to borrow a phrase from *J v M Ltd*, "basically tell [him] to F. off" (*J v M Ltd*, 1989: 760). The only repercussions she would have to fear would be social, and possibly physical. It is this distinction that has allowed sexual harassment in the workplace to be viewed as a "question of public justice for women rather than as a private matter" by judicial systems "in many parts of the world" (Lacey, 1993: 5).

This distinction, while important and necessary for regulatory definitions of sexual harassment, becomes less compelling for social scientists undertaking research into a perplexing and complex social problem, and even less so for feminists trying to challenge and change, rather than regulate, behaviour. In these instances, the imperative is to understand or challenge the *behaviour* itself, in whatever context it occurs. This is a process that demands a rather more flexible definition of sexual harassment than most regulatory definitions provide.

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<sup>6</sup> Own emphasis.

Further, the regulatory definitions that dominate the field tend to be drawn from North America, with a particular emphasis on sexual harassment as a form of sex discrimination. This has given rise to the development of a particular research approach to the understanding of sexual harassment. It is an approach that I think has narrowed the way in which sexual harassment has been explored, particularly with regard to the way in which the concept of sexual harassment has been defined.

The question of whether definitions of sexual harassment should include both men and women is still debated within the literature on sexual harassment. Like many debates in the social sciences, this is one that may well be fueled primarily by the ideological perspectives of individual researchers, rather than being an intrinsic aspect of the construct itself. Those surveys which have included men in the sample have shown that men can, and are, harassed both by women and, more usually, by other men. It seems entirely inadequate to offer a definition that excludes this possibility:

Although fewer men than women are sexually harassed in the workplace, particularly by women, the problem cannot be defined out of existence (Russell, 1984: 274).

One of the consequences of the early construction of sexual harassment as one in which men, exclusively, were harassers, and women were exclusively victims, is that the male experience of sexual harassment remains under-researched. At present, we do not know how these experiences could further our understanding of sexual harassment. For example, Till's (1980) seminal study classified only women's experiences of sexual harassment. While it is possible, even probable, that his classification would not have changed if he had included men in his sample, the fact remains that this influential study has examined a social problem - that involves gendered interactions - from a single point of view.

A further consequence of the exclusion of men from operational definitions of sexual harassment is that it has allowed some researchers to argue that "... a woman's experience of harassment is definitionally valid whatever the perceptions of observers may be; *her perception of an interaction is definitionally sufficient*. It is not however necessary"<sup>7</sup> (Fitzgerald, 1990: 37). Fitzgerald justifies this assertion by arguing that women are "socialized to accept many nonconsensual or even offensive sexual interactions as being nonremarkable, a fact of life". In support of this she cites, as an example, a study (Fitzgerald, Weitzman, Gold & Ormerod, 1988) in which "women students indicated experiencing behaviours clearly qualifying as harassment (*e.g.*, propositions, fondling, etc.) yet often did not label those as such" (Fitzgerald, 1990: 37).

It is possible to accept the argument made above, without drawing the same sweeping conclusion that Fitzgerald does. The masking of sexual violence and sexual harassment, is an issue that needs to be addressed in the design of research programmes. This can be done in a variety of ways, some of which will be discussed in Chapter Five. The fact that masking occurs is sufficient reason to argue that the labelling of particular behaviours as "harassment" on the part of the victim is not a definitional prerequisite. But it is not sufficient reason to argue that labelling is definitionally sufficient. To argue that perceptions alone qualify particular actions as sexual harassment, solely on the grounds that the perception is that of a woman, is a particularly unsound and deterministic research approach to subscribe to, and an intrinsically unjust regulatory approach to adopt.

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<sup>7</sup> In support of her argument she cites LaFontaine & Tredeau, 1986: 435. Own emphasis.

## **Towards a New Definition**

As the above section demonstrates there are a range of ways in which sexual harassment may be defined. The definition which I have found to be particularly compelling, is that adopted by the European Economic Community:

Sexual harassment means unwanted conduct of a sexual nature, or other conduct based on sex affecting the dignity of women and men at work. This can include unwelcome physical, verbal or non-verbal conduct. (Rubenstein, 1992: 70).

The primary strength of this definition is it is straight forward and accessible. In contrast to the EEOC definition, or that used in *J v M Ltd*, sexual harassment is not confined to "conduct of a sexual nature", but includes "conduct based on sex" affecting the "dignity" of workers. The particular wording of the definition de-emphasises the sexual aspect of harassment, and avoids . Firstly, it throws into focus those acts of harassment not explicitly sexual (ie sexist jokes and comments etc), that are the cornerstone of environmental harassment. Secondly, Finally, the use of "*dignity* of women and men", correctly makes sexual harassment a universal, human rights issue, rather than a question of a women's personal rights.

The above definition, by stressing that sexual harassment is "unwanted" and "unwelcome", makes clear that it is for each individual to determine what behaviour is acceptable to her/him and what s/he regards as offensive. In other words, attention is focussed on the reaction of the recipient to the behaviour, rather than on the intent of the perpetrator.

Finally, the definition is also flexible enough not to be bound by context. Leaving out the phrase "at work" does not fundamentally affect the definition, as the central aspects of the definition (that of unwanted sexual conduct, or conduct based on sex, that affects the dignity of women and men) remain.

## **Conclusion**

It is unlikely that all researchers will agree with the strengths of the above definition, and I concede that a variety of definitions could be used. Rather than defend a particular one here, I suggest that what is needed at present is a particular emphasis on research methodology in literature on sexual harassment. In the absence of a widely accepted definition of sexual harassment, and in the pursuit of achieving one, making explicit the boundaries of behaviours that are included and excluded within working definitions of sexual harassment would seem to be an important and necessary aspect of research into sexual harassment.

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## Chapter Four

### RESEARCH AS INTERVENTION

Is not the supreme and most insidious exercise of power to prevent people ... from having grievances by shaping their perceptions, cognitions and preferences in such a way that they accept their role in the existing order of things, either because they can see or imagine no alternative to it, or because they see it as divinely ordained and beneficial? (Lukes, 1974: 24 cited in Room, 1986: 55).

This chapter examines the question of research methodology in relation to the investigation of sexual harassment. The central proposition I shall investigate is whether or not the research process can be used to play an educative role while still retaining scientific rigour and integrity. This question arises from the challenges posed by undertaking research into sexual harassment. As discussed in the previous chapters, the problems associated with undertaking research into sexual harassment include concerns with definitional ambiguity and the reluctance or refusal of victims to label inappropriate, offensive, or exploitative behaviour as sexual harassment or sexual violence. "Participatory" and "action" research will be looked at as two examples of explicitly interventionist research approaches. Finally, I will argue that a multi-method research approach is needed to investigate sexual harassment.

#### Research into Sexual Harassment

A great deal of research into sexual harassment has focussed on attempts to measure and classify it (Fitzgerald, 1990: 30-31). This has frequently involved the use of surveys and questionnaires. Investigations have been divided into two types. The first has utilised an open ended survey method, simply asking respondents if they have ever experienced sexual harassment, and if so to describe the incident (Till, 1980; Benson & Thomson, 1982). Other studies have involved

presenting subjects with a list of sexually harassing behaviours and asking respondents if they have ever experienced any of them (Wilson & Kraus, 1983; Adams, Kottke, & Padgitt, 1983; Maihoff & Forrest, 1983.)<sup>1</sup>.

Fitzgerald argues that because "the objective measurement of sexual harassment remains at a somewhat rudimentary level", a number of problems are inherent in these studies. She contends that the issues of "reliability and validity" have not been sufficiently addressed in the seminal studies she cites. While some of the criticisms she raises in relation to the studies are technical and hence not specifically related to sexual harassment (for example, "no study reports a test-retest correlation coefficient", so that there is "no assurance that the subjects' responses are stable"), others are more directly related to the problems associated with undertaking research into sexual harassment. (Fitzgerald, 1990: 32). It is these latter criticisms that I shall focus on.

With regard to the question of validity Fitzgerald argues that "there are logical grounds upon which to suspect that subjects may not have interpreted the items in the same manner". In Till's (1980) study, for example, subjects were asked whether they had experienced "sexual harassment". Fitzgerald correctly points out that such a procedure introduces "a large element of error into the measurement [as] it has been widely demonstrated that substantial individual differences exist in the perceptions of what constitutes sexual harassment"<sup>2</sup>. Finally, she queries the basis upon which many of the studies have chosen the list

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<sup>1</sup> All studies cited in Fitzgerald, 1990: 31. Benson & Thompson (1982) provided a general definition of sexual harassment in their survey. The lists provided by Wilson *et al* (1983), Adams *et al* (1983), and Maihoff *et al* (1983) differed from one another, but the process was the same.

of behaviours they have included in their surveys as examples of sexual harassment:

Examination of the studies suggest that several tap a rather narrow spectrum of behavior (eg Maihoff and Forrest, 1983) while other list what might be considered the major facets of the domain but do not include items to measure each facet (eg Rielly, et al, 1982; USMPB, 1981), suggesting that they may not have been adequately sampled and measured. (Fitzgerald, 1990: 33).

While these are all valid and worthwhile points to raise in the context of designing questionnaires to investigate the occurrence of sexual harassment, what is not addressed is the question of whether or not an approach which emphasises the measurement and classification of a construct through questionnaires and surveys is in fact the most useful one to adopt.

Given that sexual harassment is a relatively new area of study, and that even the definition of the construct remains contested terrain, a research approach which emphasises its meaning, rather than its frequency, could make a useful contribution towards deepening our understanding of the concept itself. Further, I have previously argued that sexual harassment is essentially a social construct. Hence, an important and fruitful area of study would be to develop an understanding of the different ways in which it is constructed and why. In this regard, a research approach which allows research subjects to speak for themselves, or one which encourages a "dialogue" between researcher and subject/s, may well prove to be a beneficial route to explore.

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<sup>2</sup> See, for example, Gutek & Morasch, 1983 and Ormerod, 1987. Cited in Fitzgerald, 1990: 32.

Bernstein argues that by uncritically accepting a subjective interpretation of "social reality", what may be "overlooked" is the "*power* of others to impose *their* definitions of situations upon participants"<sup>3</sup>. He points out that the "ability of certain individuals, groups, classes, and authorities to persuade others to accept their definitions of situations demonstrates that while ... social structure is a consequence of the ways in which we perceive social relations, it is clearly more than this" (Bernstein, 1974, cited in Cohen & Manion, 1989: 37). While Bernstein's point is made in reference to formal power relations, it could also be used to explain the process by which "women are ... socialised to accept many nonconsensual or even offensive sexual interactions as being nonremarkable" (Fitzgerald, 1990: 37). Or in Bernstein's terms, how a less powerful social class ("women") are persuaded to accept the definition ("nonremarkable") of a particular social interaction that is in fact abusive and exploitative (sexual harassment).

How can issues such as these be addressed within the research process?

## **Research as Intervention:**

### **Participatory and Action Research Models**

Fitzgerald suggests that research into sexual harassment provides an opportunity "to make a contribut[ion] to social change" (1990: 22). There are a number of ways in which this can occur. The example she gives is that of providing expert reports to support cases of sexual harassment that are taken up in the courts. A further way in which social change can be encouraged is through policy research. While policy research covers a broad range of issues, in this instance it is used to

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<sup>3</sup> Emphasis in original.

denote research which has, as its explicit goal, the development of effective policy and procedures to combat social problems, such as sexual harassment.

Lukes argues that the exercise of power in policy-making operates at two different levels which he labels "overt" and "unintentional". More powerful groups in societies can ensure that their interests are represented by lobbying for support within decision making forums, by making the decisions themselves, or by excluding issues and policy options from being considered by decision making bodies. This is an overt exercise of power. (Lukes 1974, cited in Room 1986: 55).

The overt exercise of power in relation to policy-making may go some way towards explaining why so few institutions have policy and procedures on sexual harassment: this is despite the struggles waged, primarily by women, to ensure that such policies are adopted at, for example, universities and workplaces. Decision making forums in these institutions tend to be overwhelmingly dominated by men. As I have demonstrated previously, men are less likely to experience harassment than women, and less likely to label sexual behaviour as sexual harassment. Hence, they are also less likely to view it as a problem in need of redress. Their positions of structural authority mean that it is unlikely that sexual harassment will be high on their agenda of priorities to be addressed, despite it being a pervasive and costly social problem<sup>4</sup>.

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<sup>4</sup> In the *MSPB* study (1981) it was conservatively estimated that sexual harassment cost the United States' Federal Government US\$ 189 million over a two year period. These costs were calculated largely on the basis of a decline in individual or group productivity as a result of sexual harassment. See *MSPB Report* 1981: 15, cited in Russell, 1984: 271.

Lukes argues that there is another level at which power is exercised in relation to policy-making. He suggests that power can be exercised *unintentionally*. The unintentional exercise of power can work to the detriment of less powerful social groups while they remain unaware of its effect, and so unable to articulate either their opposition or alternatives:

Is not the supreme and most insidious exercise of power to prevent people ... from having grievances by shaping their perceptions, cognitions and preferences in such a way that they accept their role in the existing order of things, either because they can see or imagine no alternative to it, or because they see it as divinely ordained and beneficial? (Lukes, 1974: 24, cited in Room, 1986: 55).

Lukes argues that in order to make the claim that power is being exercised unintentionally and to the detriment of a subordinate social group two conditions need to be demonstrated. The first is that the "acquiescence of the subordinate group is enforced"<sup>5</sup>. The second is that the identified social groups must be shown to be "regularly and systematically losing out as a result either of the actions of more powerful groups in the society or the way that the major institutions of the society are organised"<sup>6</sup>.

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<sup>5</sup> Lukes identifies three ways in which such "enforced acquiescence" might be shown: (a) By drawing parallels with similar situations in which opposition by disadvantaged groups to their position is expressed; (b) By examining how individuals from disadvantaged groups respond to opportunities to change their position in relation to the group - through, for example, social mobility; (c) By examining how disadvantaged groups respond, in times of social upheaval, to visions or "glimpses" of an alternative social order. See Lukes, 1974: 43-47, cited in Room, 1986: 55.

<sup>6</sup> Cited in Room, 1986: 56. Lukes argues that what must be demonstrated in this case is that the more powerful group (or individual) *could* have acted differently in the exercise of power.

While Lukes' argument is made primarily in relation to class, the sexist nature of our society suggests that this analysis of the unintentional, or rather unrecognised, use of power is a useful framework within which to understand the imbalance of power in relation to gender. There is ample evidence to suggest that women as a social group "regularly and systematically" lose out to men in the distribution of formal power and the social and material rewards associated with it. Similarly, an examination of the consequences of the economic and social dependence of women on men suggests that Lukes' contention that the "acquiescence of subordinate groups should be enforced" may well hold true in relation to gender subordination<sup>7</sup>. Although perhaps less obviously, the argument that sexual violence is a form of social control over women, also supports this contention<sup>8</sup>. More directly in relation to sexual harassment, Lukes' analysis echoes that made by Bernstein (1974), namely that subordinate groups may not recognise (or label) abusive practices as such.

In examining Lukes analysis of power, Room is concerned with policy-making and the power differentials between policy-makers and disadvantaged communities affected by such policies. Through the following four questions, he examines whether specific research processes can play a role in levelling the playing field between policy makers and disadvantaged communities<sup>9</sup>:

- How far can research induce social change in a manner which provides the disadvantaged with an awareness and/or a vision of an alternative social order?

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<sup>7</sup> See Oakly, 1977 and Millet, 1970 where these contentions are particularly well examined.

<sup>8</sup> See for example Millet, 1970: 40-45, Plummer, 1984: 44-49 and Vogelmann, 1990: 23-37.

- Can research help the disadvantaged reflect on their position to expose unrecognised and detrimental experiences of power?
- Can research expose the consequences of the actions of more advantaged groups?
- Can research enable the disadvantaged to develop policies and programmes to counter this experience of power? (Room 1986: 56)

Both action and participatory research represent an attempt to bring together different aspects of the process of development or change: research, policy- or decision-making, and action or implementation. Advocates of these approaches (Werdelin, 1979) suggest that these models are able to play a role in leveling the power differentials between policy makers and the communities for whom the policy is intended.

### Participatory Research

Werdelin (1979: 20) defines participatory research as a "method of social investigation involving the full participation of the community". As the name suggests, it is a research process that aims to achieve the "full and active participation of the community" in the entire research process. This includes identification of the research problem; designing the research process; undertaking the research; analysing and reporting on research data; evaluating the project; and implementing any recommendations flowing from the project. (Reason & Rowan, 1981, cited in Ramphela, 1990: 2).

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<sup>9</sup> Room asks these questions specifically in relation to action research.

Participatory decision-making is dependent on the extent to which participants understand the goals and processes of the research project. In order to ensure that "the community" can participate in the research process in an informed rather than a nominal way, the researcher is expected to play a role as an "educator". As such, participatory research abandons entirely the role of researcher as "objective observer" (Werdelin, 1979: 20).

Advocates of participatory research claim that if this approach is adopted, the research process can become a vehicle through which problems within a community can be identified and solved by the community itself, as opposed to ideas and recommendations being imposed by experts. They suggest that the value of participatory research is that the community is made responsible for the success or failure of the project, rather than outsiders. This limits the potential for dependency on outside resources, and develops self-reliance on the part of participants. Implicit within this is the expectation that the research process itself will play an empowering role within the affected community. Werdelin (1979: 20) also contends that the participation of the community within the research process allows for a "more scientific method of research" as the research process "facilitates a more accurate and authentic analysis of social reality".

Room (1986) and Ramphela (1990) both argue that despite these laudable intentions, in practice participatory research has not lived up to the expectations of its practitioners. It is precisely in attempting to meet the requirements that give the greatest strength to this approach that the cause for its failure can be found. There are a number of advantages to ensuring the participation of an affected community within the research process: the research process encourages the

education and empowerment of the community; it limits dependency on outside agencies; and, ultimately, allows the community to own the proposed solutions which maximises the chance of their successful implementation.

Such an approach, however, demands "collaboration and legitimation from different audiences": most importantly, the social scientific community, policy-makers, and the communities affected by the research process. At times, the demands of these "audiences" can be competing and contradictory. The demand for scientific rigour and validity may well be impeded by having to respond to the political and practical demands of the community which, moreover, may change as the research process continues (Room, 1986: 34). Ramphele, in her case study of a migrant labour hostel in Cape Town, points to the dilemmas of maintaining intellectual honesty in the writing up of her research project and the understandable desire on the part of her collaborative partners - the Hostel Dwellers Association (HDA) - to not make public the limitations of, and contradictions within, their organisation (1990: 9-10).

Implicit within the participatory research approach is the assumption that there is an identifiable and coherent "community", with whom the researcher works in solving a "community problem". This understanding of "community" and "participation" most often assumes a homogeneity in relation to problems (and solutions) that does not adequately take into account individual personal interests, or allow for divisions within a particular "community" based on, for example, gender, age, status, or class (Ramphele, 1990: 8-9).

If these divisions within communities are not taken into account, it is not possible to ensure the level of participation sought by practitioners of research approaches

dependent on "community collaboration". Moreover, without this recognition, participation within the project is likely to be limited to the most dominant group within the identified community. The danger inherent in this is that these dominant views could be presented as the "views of the community", rather than as those of a sub-group within it. This is particularly pertinent in relation to gender: the public realm is one which is dominated by men. If the concept of "community" is uncritically accepted, without a recognition of divisions within it, it is likely that women's views and concerns will not be heard or taken into account.

Put another way, the practicalities involved in this process are such that the researcher will almost inevitably find him/herself dealing with a "representative forum" of the "community". Lukes analysis of the exercise of overt power in decision-making forums needs to be applied as rigorously to these community forums - both in relation to the internal operations of the organisation, as well as in the relationship between the organisation and the broader community it claims to represent. Such an analysis cannot be undertaken without a recognition of the possible divisions - and effect of them - within a "community".

### Action Research

Action research, while similar to participatory research, has a number of important distinctions that address some of the central criticisms inherent in participatory research. As in participatory research, action researchers are not neutral or distant observers, but active participants for change. The research process is explicitly regarded as a vehicle for the education and empowerment of the affected community (Werdelin, 1979: 20). However, in action research, the research problem is not identified by the "community", but by persons outside of

it, and the research design and implementation is seen as the responsibility of the researcher rather than a joint project with the community (Werdelin, 1979: 19).

Cohen and Manion (1989: 217) suggest that the action research method is one that "interprets scientific method more loosely, chiefly because its focus is a specific problem in a specific setting". This more flexible approach is justified as the "emphasis is not so much on obtaining generalisable scientific knowledge as on precise knowledge for a particular situation and purpose". As such, while action research can be used in "just about any setting with people, procedures and problems", its usefulness is severely limited in a number of important respects:

[Its] objective is situational and specific (unlike the scientific method which goes beyond the solution of practical problems); its sample is restricted and unrepresentative; it has little or no control over independent variables; its findings are not generalisable but generally restricted to the environment in which the research is carried out (Cohen & Manion, 1989: 226).

These two approaches demonstrate that while the research process can be used as a form of intervention into social problems, there are problems associated with using them. In particular, one of the costs associated with this strategy is that the methods may be lacking "in scientific rigour" (Cohen & Manion, 1989: 226). The concluding section of this chapter examines whether there are particular research strategies that can be adopted to address or overcome this difficulty.

## **Triangulation**

Merton and Kendall (1946) argue that "social scientists have come to abandon the spurious choice between qualitative and quantitative data: they are concerned

rather with that combination of both which makes use of the most valuable features of each. The problem is one of determining at which points they should adopt the one, and at which the other, approach" (cited in Cohen & Manion, 1989: 42). Jick (1990: 135) concurs, suggesting that quantitative and qualitative research methods should be viewed as "complementary rather than rival" approaches. Moreover, Jick argues that a *combination* of both approaches could overcome the "weaknesses found in single [research] method designs".

Campbell and Fiske (1959) argue that "more than one method should be used in the validation process" to ensure that any variance in results is not due to the research method used (cited in Jick, 1990: 137). In other words, if "different methods of data collection yield substantially the same results", greater confidence can be placed in the accuracy of the data. Further, Cohen and Manion (1989: 270) suggest that "the more methods contrast with one another" (for example, questionnaires and participant observation), the greater the confidence that can be placed in them .

Jick (1990: 136) defines triangulation as "the combination of methodologies in the study of the same phenomenon". Cohen and Manion (1989: 272-275) suggest that this includes not only the use of two or more methods in studying a single phenomena, but also *space triangulation* (repeating the study across different cultures); *time triangulation* (either repeating the study on the same group at later stage, or collecting data on different groups at the same time); *investigator triangulation* (using more than researcher in a single study, for example more than one observer in a participant observation research project); and *theoretical triangulation* (drawing up "alternative or competing theories", rather than a single one). Whatever the specific approach adopted, the objective remains the same:

... triangular techniques in the social sciences attempt to map out, or explain more fully, the richness and complexity of human behaviour by studying it from more than one standpoint (Cohen & Manion, 1989: 269).

Jick suggests that triangulation is a useful approach to adopt where a "complex phenomenon requires elucidation". Triangulation not only provides the opportunity to view such a phenomenon from different perspectives, but perhaps less obviously, "multiple methods may also uncover some unique variance which otherwise may have been neglected by single methods". According to Jick, "discrepancies in the multimethod results" lead him to ask questions and to uncover results that he would not have, if he had exclusively used either quantitative or qualitative methods. (1990: 143).

While triangulation is not new and its "advantages are not unappreciated", it remains an underutilised research approach. There are some disadvantages to triangulation that may explain this. Firstly, it can be a more cumbersome and time-consuming approach than that of utilising a single method. This may be one of the reasons that "research designs that extensively integrate" quantitative and qualitative data are "rare". Secondly, the replication of triangulated studies for the purpose of verification, is virtually impossible to do. This is particularly the case in studies which use qualitative and quantitative methods. Finally, the "basic assumption" upon which the effectiveness of triangulation rests, namely that "the weaknesses in each single method will be compensated by the counter-balancing strengths of another", may not always hold true (Jick, 1990: 141).

While making these points, Jick asserts that, in general, the use of qualitative and quantitative methods do complement one another. The difficult process within

triangulation is the "delicate exercise to decide whether or not results have converged". One of the weaknesses of this approach is that where results do not converge, the determination of what evidence to use, and what weight to give to this evidence, becomes a largely "subjective one":

Overall the triangulation investigator is left to search for a logical pattern in mixed methods results. His or her claim to validity rests on a judgement, or as Weiss (1968:349) calls it "a capacity to organise materials within a plausible framework" (Jick, 1989: 145).

## **Conclusion**

In conducting the research of the Committee of Enquiry into Sexual Harassment at the University of Cape Town, we adopted an explicitly interventionist approach by making education an integral part of the research process. In using this strategy, we ran the risk of our research results being dismissed as biased or lacking in scientific rigour. That they were not, was in part because we also adopted a multi-method research approach. By using a range of research methods, which yielded similar results, we were able to defend our findings from potential criticism. Further, we found that the educative component of the research process was extremely valuable in overcoming the problems of labelling, identified by Fitzgerald (1990). Finally, successfully exploring the complexity of the problem we were investigating (sexual harassment and violence between students) was made easier by adopting a research approach that gave us a multi-vantage or multi-perspective on it. The way in which this was achieved is discussed in the following chapter.

## Chapter Five

# **A Case Study of the Committee of Enquiry into Sexual Harassment at the University of Cape Town.**

In many senses, sexual violence remains a virtually hidden, unsanctioned and misunderstood crime in South Africa (Committee of enquiry into sexual harassment, 1991: ii).

This chapter examines the work undertaken by the Committee of Enquiry into Sexual Harassment at the University of Cape Town<sup>1</sup>. The focus is on the research methods used to explore and document the problem of sexual harassment at a major university in South Africa. The research results of the Committee are not looked at<sup>2</sup>. The reasons for the establishment of the Committee, some of the problems encountered, and the ways in which these were addressed are examined. Particular attention is given to the way in which a multi-method research approach assisted the Committee in gaining a greater understanding of sexual harassment at the University.

### **Establishment of the Committee**

The Committee of Enquiry into Sexual Harassment at the University of Cape Town (UCT) was established by the Vice-Chancellor and Principal, Dr Stuart Saunders, in November 1989. Three University staff members, Dr Mamphela Ramphele (Social Anthropology Department), Frank Molteno (Sociology Department), and Mary Simons (Political Science Department and Panel on Sexual Harassment) were appointed to the Committee. Ramphele was appointed

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<sup>1</sup> Hereinafter referred to as "the Committee".

<sup>2</sup> For a discussion of the results see *Final Report: Committee of Enquiry into Sexual Harassment at the University of Cape Town*, UCT, October 1991.

to chair the Committee. The Committee was required to report directly to the Vice-Chancellor. Following the first meeting, funding was requested for a research assistant and in January 1990, I was appointed to this position. The final report of the Committee was submitted to the Vice-Chancellor in October 1991.

The terms of reference of the Committee required that we conduct a "university-wide" investigation into "attitudes, traditions and accepted behaviour" that gave rise to "infringements of the University's policy in regard to sexual harassment". The terms of reference placed a special emphasis on students and, more particularly, the "fears on the part of women in residence"<sup>3</sup>.

### UCT's Policy on Sexual Harassment

In September 1988, the University's Council and Senate approved proposals to deal with sexual harassment at the University. Sexual harassment was recognised as "a form of discrimination" which was "unacceptable to the University". In the policy document sexual harassment is defined as:

requests for sexual favours, or unwelcomed, or repeated or flagrant sexual advances, or demeaning verbal or other expressive behaviour when:

- (a) submission is made either explicitly or implicitly a term or condition of an individual's employment or status as a student; or
- (b) submission or rejection by an individual is used as a basis for employment or academic decisions affecting him or her, or for awarding or withholding favourable employment or academic opportunities, evaluations or assistance; or

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<sup>3</sup> See *Appendix Two: Terms of reference of the Committee of Enquiry into Sexual Harassment at UCT.*

(c) its purpose or effect is interference with the individual's performance at work or in study by creating an intimidating, hostile or offensive environment in which to work or learn<sup>4</sup>.

In recognising both *quid pro quo* and environmental harassment, this definition is similar in scope and nature to that used in the Equal Employment Opportunity Committee's (EEOC) *Guidelines on Sexual Harassment*. The University policy makes allowance for both formal and informal resolution in cases of sexual harassment. To assist in this process, provision is made for the appointment, by the Vice-Chancellor, of a "panel of mediators". Panel members, trained by the University, act as counsellors or mediators for complainants<sup>5</sup>.

From the University's definition of sexual harassment it is clear that the policy is intended firstly, to protect staff members and students from inappropriate and exploitative relations either between staff members or between staff members and students; secondly, to combat discriminatory employment practices; and, finally, to establish a safe and comfortable work and/or study environment.

From this, it might be expected that a study investigating "infringements" of the sexual harassment policy at the University would primarily be concerned with the responsibilities of the institution as an employer body, (that is, discriminatory employment practices), and as an educational institution, (that is, inappropriate and exploitative relationships between staff and students). It is these issues that

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<sup>4</sup> See *Appendix Three: UCT's Policy on Sexual Harassment*.

<sup>5</sup> Essentially, the panel members are there to assist the complainant either through an informal process, by talking to the alleged harasser in the case of genuine misunderstandings or where the issue can be resolved without formal disciplinary procedures; or, if the issue cannot be resolved in this way, by assisting the complainant in instituting formal disciplinary action through the Vice-Chancellor's Office. In such cases, the matter will be dealt with in terms of the general staff or student disciplinary provisions, which include the right of response and defence of the accused.

dominate the currently available literature on sexual harassment at universities in North America and Europe.

Relationships between staff, and between students and staff, did not form the central focus of the work undertaken by the Committee. The reasons for this lie primarily in events preceding the establishment of the Committee, which gave rise to an alternative set of priorities. Our focus, relations between students, allowed us to explore an under researched area of sexual harassment on campus. By documenting the causes and, more importantly, the effects of damaging and abusive relations between "peers", we were able to show how such relationships could profoundly affect students' ability to participate both in the academic and social life of the university. In other words, we were able to demonstrate that the university needed to address the question of relationships between students if a "safe and comfortable work or study environment" was to be provided for students. Moreover, our research focus necessitated the development of new and creative research approaches that we had not encountered in our literature search of studies into sexual harassment at other universities.

### Events Precipitating the Committee

The establishment of the Committee followed in the wake of the distribution of an anonymous pamphlet at the University in September 1989<sup>6</sup>. The pamphlet alleged that four students, named in the pamphlet, were known rapists on campus. The pamphlet, which called for the "castration" of all rapists, accused the University Administration of not taking the issue of sexual assault seriously enough. Finally, it was suggested that sexual violence and harassment were frequent occurrences at the University:

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<sup>6</sup> See *Appendix One*: Copy of the Pamphlet.

Some men on this campus have declared war against women. They have claimed the right to decide where women should be and when. They are dictating to women what they should wear and how they should live their lives. They are harassing, assaulting and raping the women of UCT (Anonymous pamphlet, September 1989).

The allegations contained in the pamphlet, and the manner in which they were raised, were viewed in a very serious light by the University Administration. The Acting Vice-Chancellor issued a press statement following the appearance of the pamphlet:

[T]he University has established a thorough and meticulous structure for the sensitive but effective handling of matters involving sexual harassment. Policy and procedures have been clearly set out. ... The policy states clearly that anonymous complaints will not be entertained or acted upon, and that it is aimed to protect both the rights of complainants and those complained against. This is a very thorough system and is further evidence of the University's concern for the issue. (Reid, September 1989)

In keeping with the terms of reference, and prompted by the issues raised in the pamphlet, we began our study by focusing on the experiences and attitudes of students, and particularly women students, in residence. We had not intended to maintain this emphasis, but the complexity of the issues uncovered during this initial period, and the need to immediately address some of them, resulted in the maintenance of this focus throughout.

Hence, the study was limited in two important respects. The first was that we dealt with a single constituency within the University, namely students. Further narrowing our focus, we placed a particular emphasis on students in residence.

Secondly, the study concentrated on abusive behaviours between students that could more properly be termed sexual violence.

However, in addressing sexual violence between students the Committee did explore a wide range of issues: defining and understanding sexual harassment; the nature and extent of students' experiences of sexual harassment and sexual violence; attitudes towards sexual harassment; traditions and behaviours that encourage (or are) sexual harassment; attitudes towards University authority; and disciplinary policy and procedures at the University. Through this process an understanding of the nature of sexual harassment and the difficulties of undertaking research into it was developed.

### **Problems with Context**

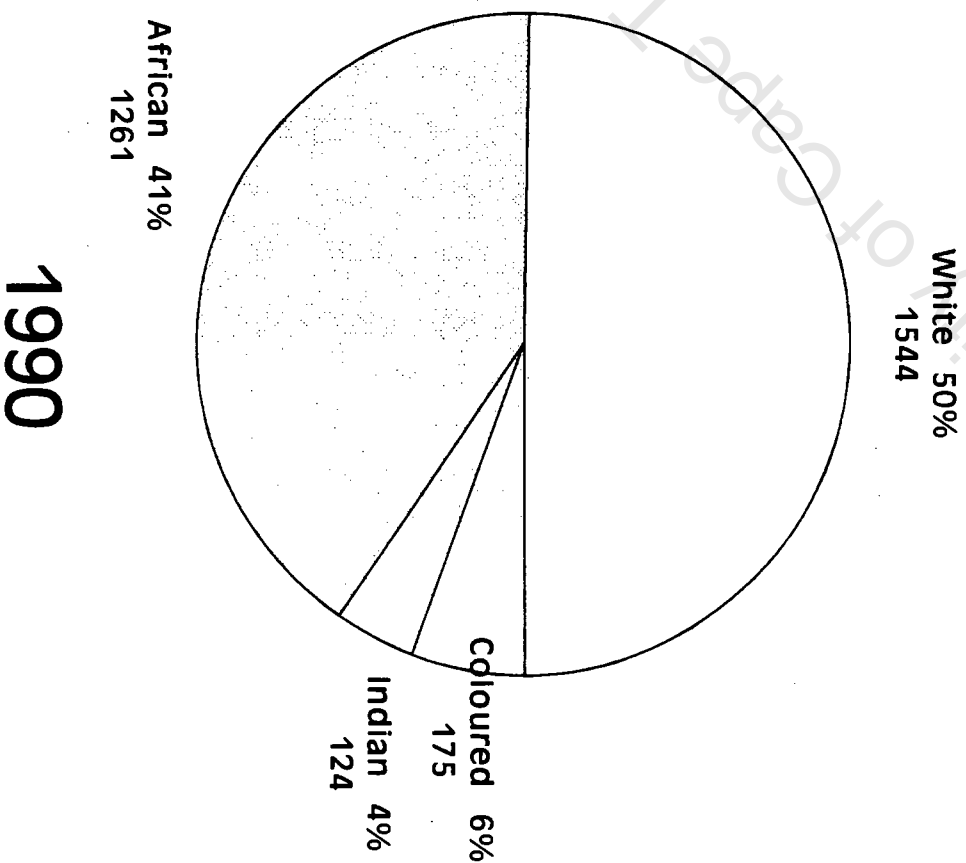
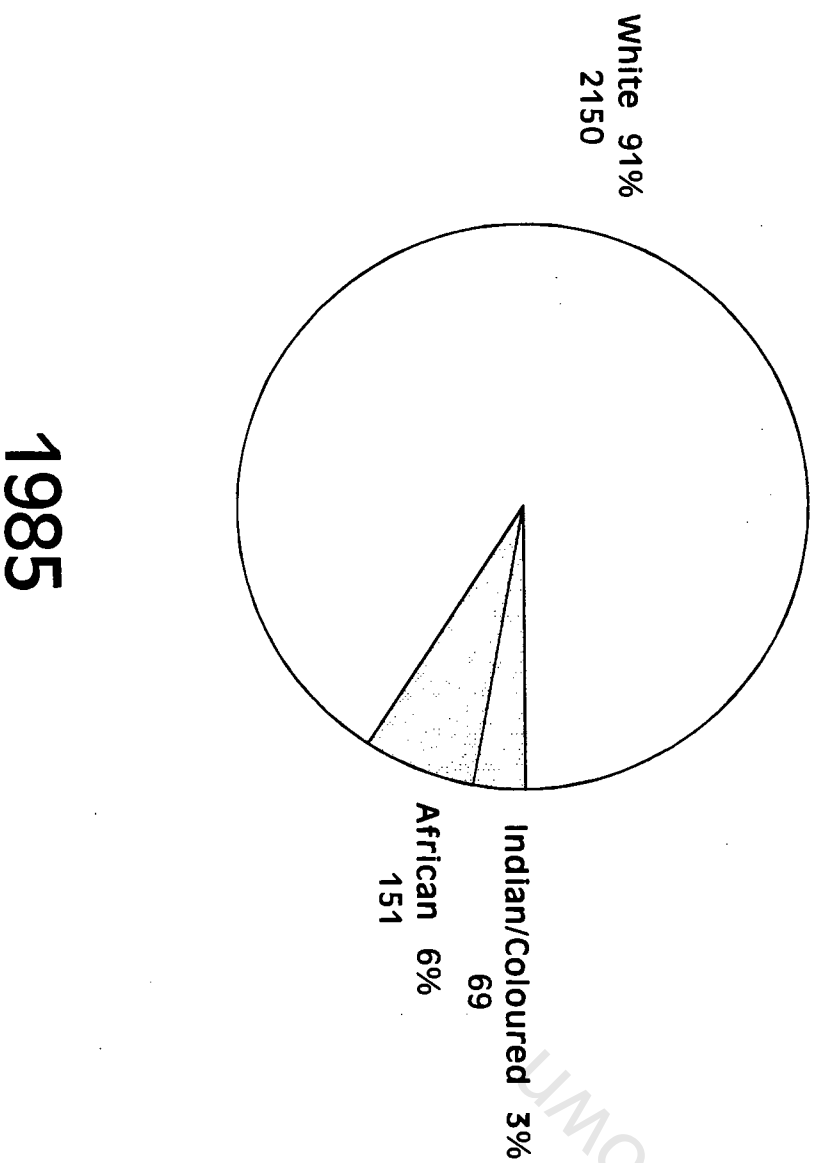
The research project undertaken by the Committee was the first major study of social relations between students at the University. Importantly, this study took place against the backdrop of rapid and significant changes in the student body, particularly in the University residences. In 1977 there were 678 black students attending UCT, less than 7 percent of the student body. A decade later this number had increased almost four-fold to 2 623, which was 20 percent of the total student body (Goosen & Hall, 1988: 37). In 1990, the year that the Committee began its research, over 25 percent of the students at the University were black<sup>7</sup>.

The changes in the residence system of the University were even more dramatic [see *Figure One*]. Until the repeal of the Group Areas Act in June 1991, the informal student housing in the vicinity of the University was situated in designated "white" areas. In order to address transport and accommodation

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<sup>7</sup> Until 1985 the South African Government restricted the admittance of black students to the University.

# FIGURE ONE. CHANGES IN RACE/ETHNIC COMPOSITION: 1985 and 1990



problems faced by black students there was, from the mid-1980's, an "increasing acceptance that the University would have to provide residence accommodation for African students who needed or wanted it", in order to both "recruit and retain" black students<sup>8</sup>.

The profile of students living in residence changed considerably during this period as steadily increasing numbers of black students, particularly African, moved into the University residences. This resulted in the residence system accommodating greater numbers and a greater diversity of students. In 1985, 2 470 students were living in residence. By 1990, this had risen to 3 104. During the same period, the number of white students in residence decreased from 2 150 to 1 544, so that while white students made up 91 percent of students in residence in 1985, they made up only 50 percent of the same in 1990. In contrast, the percentage of African students in residence increased from 6 percent in 1985 to 41 percent in 1990<sup>9</sup>.

But, perhaps of greatest importance was the fact that the changes within the residences and the student body more generally were not mirrored by similar changes in the staff at UCT [*see Figure Two*]. Of the 750 full-time academic staff members at the University in 1990, 39 (5 percent) were black. Similarly, with the exception of the Deputy Registrar in charge of Student Affairs, all the most senior positions in the University administration were held by white members of staff<sup>10</sup>. The virtual absence of black staff in the decision-making bodies of the University brought into question, particularly on the part of black students, the

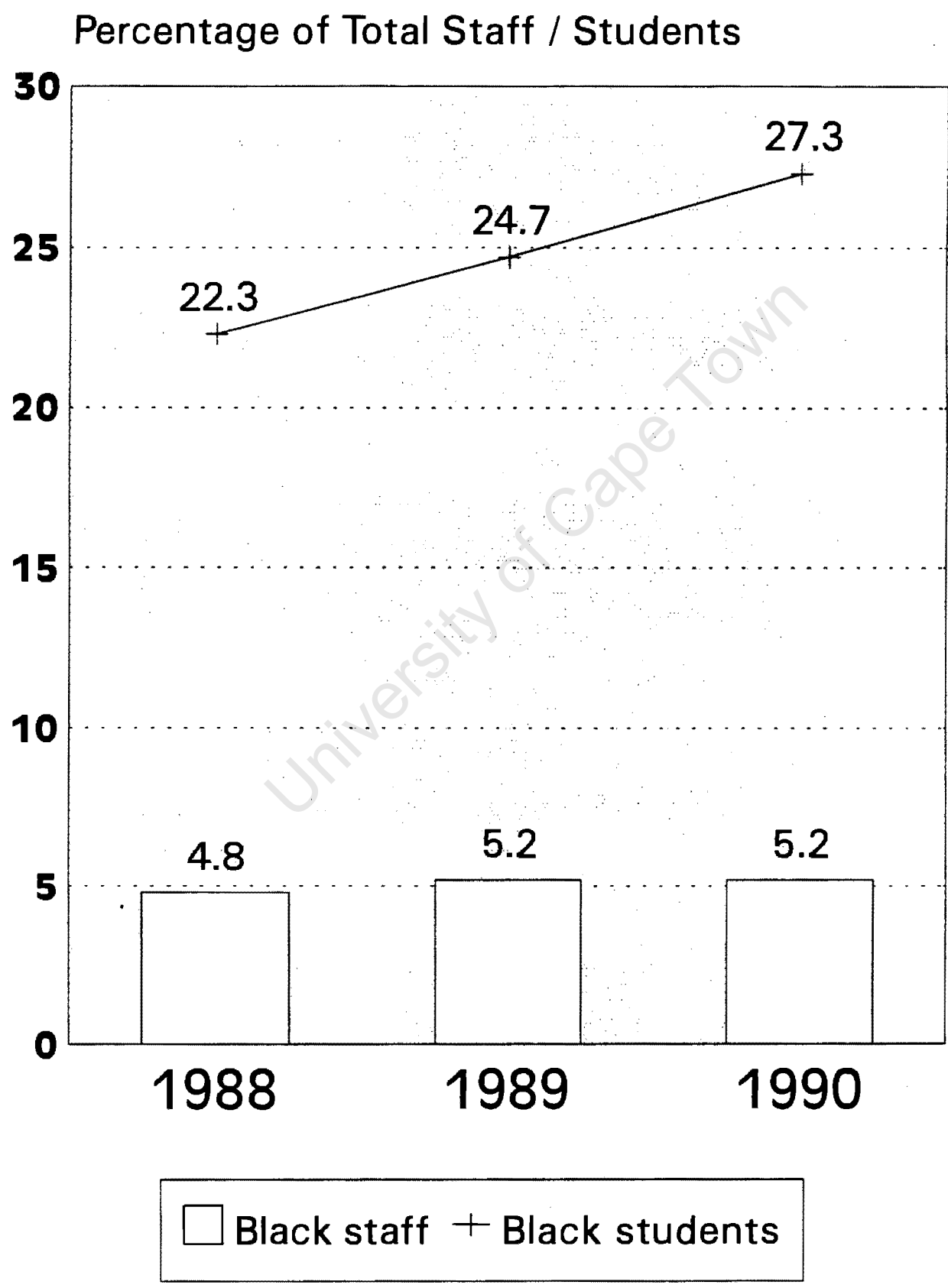
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<sup>8</sup> Interview with Jon File, Academic Secretary, UCT, November 1992.

<sup>9</sup> Figures provided by the UCT residence administration.

<sup>10</sup> See *Employment Equity at UCT*, 1993. These positions include the Vice-Chancellor, and the Deputy Vice-Chancellors, as well as the Registrar and the Deputy Registrars. There are approximately 20 of these senior management positions within the University.

**FIGURE TWO: Comparison Between Black Staff and Students  
1988 - 1990**



legitimacy of the authority of the University, particularly in relation to the rules and disciplinary processes of the institution.

Prior to the 1980's black students "tended to withdraw, keep to themselves, avoiding associational activity and participation in student politics" (Van der Merwe & Welsh, 1977: 140). However, as the number of black students increased, the policy of self-exclusion changed to one of direct engagement and confrontation with the University Administration. At the time that the Committee was undertaking its research, the dominant position of the black students' organisation on campus (the South African National Students' Congress, SANSCO) was, according to a senior office bearer, "one of suspicion and distrust" of "anything" related to the University Administration<sup>11</sup>. Brendon Roberts, the Deputy-Registrar in charge of Student Affairs, described this position as one of almost "principled antagonism" on the part of many SANSCO members, and black students generally, towards the University Administration<sup>12</sup>.

This "principled antagonism" was directly related to a rejection of "white authority" in general: in the eyes of many students the University Administration paralleled the South African government in being almost exclusively white. Thus, its authority and legitimacy was similarly to be confronted and challenged. Within SANSCO, an organisation consisting of black students with an explicit anti-apartheid programme, such an argument was widely accepted<sup>13</sup>.

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<sup>11</sup> Interview with 1989 SANSCO Executive Member (on condition of anonymity), October 1992.

<sup>12</sup> Interview with Brendon Roberts, Deputy Registrar, UCT, October 1992.

<sup>13</sup> However, as Roberts points out: "It was of course, more complex than that - I think the leadership [of SANSCO] - and here I mean really the executive members - had a much more sophisticated view of the Administration at UCT. I think there was a strong element of mutual respect, from the students and the administrators they dealt with".

The significant changes within the student body composition at the University, and the associated challenge to University authority, gave rise to a particular set of problems that needed to be addressed by the Committee before we could conduct our research: when a group of students on a campus view "anything" coming from the Administration with suspicion, this is an important aspect of the context in which an official University Committee is working. Indeed, understanding why a situation such as this had arisen formed an important aspect of the work undertaken by the Committee. Particular research strategies had to be developed in order to overcome the difficulties we had in meeting with SANSCO and encouraging black students to participate in the research project.

In addition, especially in the initial stages of the project, our work was hampered by the absence of a study on the question of racism and racial harassment at UCT. It was argued repeatedly by a broad range of students and staff that the "real question" the University should be addressing was "racial harassment and victimisation". Our work, at times, was viewed with suspicion and resentment, particularly by black students who felt that the emphasis on sexual rather than racial harassment was another example of the University's insensitive response to the needs and experiences of black students on campus.

### **The Research Process**

The research process we developed was shaped both by the subject matter being investigated (sexual harassment and violence) and the context in which we were working. We felt strongly that our research should both educate and inform the campus community and empower students, particularly women students, to deal with sexual harassment. In part, our role as educators was an essential extension to our research: we found that the vast majority of students did not have a clear understanding of what sexual harassment was, nor why it was important for the University to address it. Hence, for example, in order to probe students'

experiences of sexual harassment we had to assist students to label those unwanted sexual experiences that made them feel uncomfortable, powerless or angry as "sexual harassment" - in essence to give a name to their feelings.

To facilitate the process of raising awareness around the issue of sexual harassment, I ran and attended numerous educational forums and workshops. These were most often held at students organisations' requests, but at times on the Committee's initiative. In order to engage as many students as possible in discussion around sexual harassment, we designed research projects that were highly participatory in nature. We employed a number of students as research assistants throughout the year. In order to deepen their understanding of the issues surrounding sexual harassment, the research assistants were trained in special workshops. Through this process we developed a "resource pool" of students - particularly those involved in leadership structures - who could act as informal and formal educators and counsellors for other students.

Every effort was made to work closely with student organisations on campus, and to this end met with the Students' Representative Council (SRC); RAG, and numerous residence House Committees and Sub-Wardens. While we were not always as successful as we might have wished to have been in this endeavour, we found the contact that we established with individual members on these structures extremely useful in terms of facilitating contact with other students. We also believe that this process assisted greatly in raising general student awareness around sexual harassment and sexism. For example, subsequent to our initial contact with students, we had numerous requests to run workshops and forums on sexual harassment, sexism and racism.

A variety of different methods were used by the Committee to investigate the nature and extent of sexual harassment at the University. These included

observation, a questionnaire, focused discussion groups run by trained research facilitators, structured interviews with selected staff and students, and a telephone-in. Beyond these formal research methods, we received a number of "drop-bys" from students who were aware of our research and wished to contribute by relating their own experiences.

## Literature Review

In order to understand and define sexual harassment, and to explore alternative ways of addressing it, the research process began with an extensive literature review of material both here and in the United States, Canada, Great Britain and Australia. The emphasis on literature from outside of South Africa was necessitated by the lack of published research on rape and sexual harassment in South Africa. *The Sexual Face of Violence* (Vogelman, 1990) is the only book about rape in South Africa based on original research:

[M]ost of [the] theory and analysis of rape [in *The Sexual Face of Violence*] comes from United States and British sources. Indeed, Vogelmann cites only two published and two unpublished works on rape or sexual abuse of South African women in his twelve-page bibliography on rape (Russell, 1991: 2).

We found a similar dearth of published works on sexual harassment in South Africa: to our knowledge, this project was the first university sponsored research into the question of sexual harassment in Africa.

## Individual interviews

In order to assess the extent to which members of the University community were aware of the sexual harassment policy, and to gauge the extent to which sexual harassment was regarded as a problem on the campus, structured interviews were conducted. These were held with student leaders, and University personnel

such as Wardens, University Court Officials, members of the Sexual Harassment Panel, academic staff and Union representatives. Participants were asked four central questions: whether they knew about the University's policy on sexual harassment, what they understood constituted sexual harassment, how they thought it should be dealt with on campus, and whether they had ever had to deal with cases of sexual harassment and/or violence on campus. More probing questions (such as details of cases participants had encountered) were asked in response to these core questions.

### Observation

I attended a number of University functions such as Orientation Week, Intervarsity sing songs, and residence parties in order to gain an understanding of social relations between students by observing their interactions at social events. In addition I visited eight residence pubs and ate in six residence dining halls to get a "feel" for life as experienced by students on campus and in residence.

### Questionnaire

With the assistance of their wardens and house committee members, 650 questionnaires were distributed at six University residences<sup>14</sup>. The questionnaires were distributed to both men's and women's residences. The principle purpose of the questionnaire was to investigate students' attitudes towards and experiences of sexual harassment. In addition, we wished to explore what behaviours students would label as "sexual harassment". A section of the questionnaire focussed on students' experiences during Orientation Week. These questions dealt with what aspects of university life students had learned about since their arrival at UCT. Students were also asked how much alcohol they had consumed at Orientation Week functions, and if this had affected their behaviour in any way.

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<sup>14</sup> See *Appendix Four*: copy of the questionnaire.

In order to assess what actions students would label as sexual harassment, participants were asked to choose, from a list of actions, those that they would consider to be sexual harassment. The actions ranged from "rape" to "wolf-whistling". We also listed five experiences of sexual harassment (for example, "have you been the object of sexual or sexist jokes and comments?" "have you been touched in an uninvited and sexual way?") and asked students to indicate those that they had experienced since their arrival at University. In addition, students were asked if they had ever been "sexually harassed".

The purpose of this general question was twofold. Firstly, it allowed participants to comment on experiences that they regarded as sexual harassment but which had not been covered by the five examples given. (The follow-up question was "if you answered yes to the above question but feel that none of the examples adequately describe your experience, please briefly explain what happened".) Secondly, it acted as a means of assessing whether or not students labelled their own experience as sexual harassment.

Those students who agreed with any of the five examples given, were asked a series of questions concerning their experience/s. These dealt with the frequency of the action/s, the location/s and the perpetrator/s. Finally, students were asked if they had told anyone of their experience, and if so whom.

### **Focused discussion groups**

Small discussion groups of randomly selected residence students, facilitated by a trained research assistant, formed the basis of this aspect of our research project. The discussion groups ran for three hours. We held ten such discussion groups with between five and ten students participating in each group.

Fourteen research assistants were trained at a day-long workshop<sup>15</sup>. The purpose of the training was to deepen the research assistants' understanding of sexual harassment, to develop their research and report writing skills, and to give them a basic training in counselling.

The aim of this research project was to investigate students' attitudes towards both sexual harassment and university authority structures. Further, we hoped to use the research findings as the basis for the development of disciplinary procedures that students would both use and recognise as legitimate.

The first phase of discussion dealt with the extent to which students understood what constituted sexual harassment. We presented each group with three scenarios dealing with different examples of sexual harassment and violence. We deliberately graded the seriousness of the incidents described to see what behaviour students regarded as unacceptable and why. The scenarios were based on incidents that had been reported to us.

Included within the scenarios were typical student situations (like those that occur at residence pubs, and organised social events on campus) that involved the consumption and abuse of alcohol, and residence traditions (streaking, student auctions, residence magazine articles). The 'more serious' scenarios dealt with battery, date-rape and stranger rape. We also included scenarios that allowed us to explore the inter-action between racism and sexism.

In terms of our investigation into attitudes towards university authority, it was important to ascertain at what point students regarded an issue as serious enough

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<sup>15</sup> The training programme was developed and run by Mikki van Zyl (Rape Crisis) and Beatie Hofmeyer (LEAP).

to report it the University or broader authorities, such as the Police. Hence, in discussing the various scenarios, we asked the participants who they would tell if they experienced something of a similar nature. Finally, we wanted to investigate what rules, or codes of conduct, students saw as important to have within their residences. We did this by asking the groups to draw up their own "codes of conduct", and to suggest sanctions for the breaking of this code. Appropriate procedures and processes for this were also discussed.

### Telephone-In

As the name suggests, this is a process whereby participants are invited to speak telephonically to researchers about their particular experiences. The invited participants were staff and students at UCT, and the experiences we were investigating were incidents of sexual harassment. The real advantage of a telephone-in is that it ensures the anonymity of the respondents while allowing for a degree of inter-action between the researcher and participants.

The aim of this project was twofold. Firstly, we wanted to explore the nature and extent of sexual harassment at the University and, secondly, we wanted to encourage an awareness around what sorts of behaviours constituted sexual harassment. There was extensive advertising of the telephone-in on campus. Pamphlets and posters were distributed, an article appeared in the internal University newspaper, and a memorandum was sent to all Heads of Department requesting that they inform staff and students about the telephone-in<sup>16</sup>.

The telephone was staffed for three days from 10 am to 10 pm. Five students were trained as research assistants for this project. They were given an introductory course on sexual harassment and counselling skills. An interview

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<sup>16</sup> See *Appendix Five*: Copy of Phone-In Pamphlet.

schedule was designed to facilitate the gathering of relevant data. The questions contained in the interview schedule dealt with the nature of the experience, the perpetrator, biographical details of the respondent, whether the incident had been reported or not, and if so to whom.

## **Research Interviews**

Given the limited response to the phone-in, (we received fifteen calls), we decided to conduct interviews with students willing to talk to research assistants about their experiences of sexual harassment. Four research assistants from the telephone-in were asked to identify and interview students who had experienced sexual harassment on campus. They did this primarily by drawing on their colleagues and friends who had spoken to them about incidents of sexual harassment. As we were trying to identify patterns of behaviour rather than to record the extent of sexual harassment we felt that this approach was appropriate. The approach was also adopted in order to address the fears of students of the confidentiality and anonymity of the research. We felt that students who might not otherwise participate in the project may feel comfortable talking to a student research assistant whom they knew. The names of the students interviewed were not contained in the reports submitted to the Committee by the research assistants.

## **Evaluation of the Research Process**

### **Consultation**

Within the Committee, I was a strong advocate of consulting and working with student organisations on the design and implementation of our research work. However, the process of consultation with student leadership on the campus was a far more complex one than I had anticipated. While meetings with the SRC, RAG, and residence house committees were readily arranged, despite repeated attempts, telephonically and by letter, I was unable to meet formally with office holders in SANSCO.

Through my involvement in the student movement, prior to becoming a research assistant for the Committee, I had a number of personal friends that were members of SANSCO. When formal requests to the organisation elicited no response, I approached my friends in an attempt to understand why the Committee's approaches had been unsuccessful. I had anticipated that the issues I would need to address would involve the question of the relationship between SANSCO and the University administration. What I had not anticipated was their explanation that many women in SANSCO were too scared to be seen to be participating in a research project on sexual harassment:

I am extremely disturbed by two interviews that I have had with two women who were involved with the SANSCO Commission of Enquiry, that was set up in response to the pamphlet that came out last year. Despite the fact that two of the men named in the pamphlet were members of SANSCO, the focus of the Commission was on who had produced and distributed it.

The Commission consisted of four men and two women. Women who were called to the commission were not informed of its nature, and indeed one of the women who spoke to me said that initially she thought she was going to discuss with SANSCO how to set up educational forums on sexual harassment. Instead she was accused of being instrumental in helping to copy and distribute the pamphlet. She said during the interview that she was so scared that she had to hide her hands under the table because she was shaking so much.

The second woman that I spoke to said she was called simply because she is known as a "feminist" within SANSCO. ... This particular woman, who dresses fashionably, is very articulate and has no hesitation in arguing with men about the discrimination that is perpetuated by the traditional stereotypical role that particularly African women are often cast into, became the prime target for the Commission, primarily, in her view, because of the above reasons, not because there was any concrete evidence against her. She received a number of death threats over this period and

has now left the campus, as a direct result of the Commission. (Working report to committee of enquiry, March 1990)<sup>17</sup>.

SANSCO both projected itself, and was treated by members of the University administration, as the "representative organisation of black students on campus". While not contesting the suggestion that SANSCO was an important organisation that enjoyed the support of the majority of black students on campus, the power vested in it was one that we found could be exploited in an opportunistic and destructive fashion. This point was reinforced by a report submitted by one of our research assistants who was asked specifically to speak to black women on campus about their experience of sexual harassment on campus:

The most serious issue raised was the role that SANSCO plays [on campus]. Many of the students expressed concern about the amount of leverage exercised by the SANSCO at the University. Some of the students interviewed argued SANSCO members think "they can get away with anything", as they know the organisation will rally around them if the University tries to bring disciplinary proceedings against them. ... Women are scared to bring accusations against SANSCO members, because there is a strongly held perception that in the end very little concrete action will be taken against the students concerned. Whether this is true or not, the important point is that it is an apparently widely held perception. (Working report to committee of enquiry, April 1990).

I had accepted at face value the authority of SANSCO to speak on behalf of black students at the campus, without critically assessing the extent to which differences and divisions between black students would be represented or silenced within a single organisation. What I came to recognise were the limitations of the ability

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<sup>17</sup> I submitted monthly working reports to the Committee for discussion. Three of these were submitted to the Vice-Chancellor to inform him of the work we were undertaking, and of our preliminary results. None of the working reports were released as public documents.

of a single organisation to represent a "community". This forced me to look for alternative ways to directly involve students in the research process, beyond student organisations.

Despite the set back with SANSCO, I was able to organise and conduct interviews with a number of other student organisations (such as the SRC and residence house committees). The interviews exposed the extent to which students were unaware of the University's policy on sexual harassment, as well as the extent to which they were unable or unwilling to label behaviour as sexual harassment.

### Literature Review

The international literature reviewed was extremely useful in terms of developing a broad conceptual understanding of sexual harassment. However, the focus of much of the literature to which we had access was on sexual harassment in the workplace, with an emphasis on the relationship between employer and employee. Those studies which dealt with sexual harassment in educational institutions focused almost exclusively on the relationship between teacher and student. Further, as discussed in the Introduction, the conceptual framework of much of the work undertaken in this area was shaped by specific legislative concerns, that is, with demonstrating that sexual harassment is a form of sex discrimination. This factor, coupled with the limited focus on student to student relations, restricted the usefulness of the literature in terms of our particular needs.

### Educative Workshops and Forums

Valuable insights into students' attitudes towards sexual harassment and violence were provided by the educative discussion groups, through the questions students asked and the debates that emerged. The forums demonstrated that there was a lack of consensus amongst students about what behaviour constituted sexual harassment. Of particular concern was the extent to which some students were

willing to advocate the use of violence against women in certain situations. For instance, in a number of forums, it was argued that it was acceptable for a man to beat his girlfriend if she flirted with another man or if she insulted or embarrassed him in front of his friends. It was strongly felt among some students, that in such situations the University should not discipline a student for engaging in such actions.

These arguments were put forward exclusively by African men, and were constructed in terms of "African culture", and "African standards and values". The arguments made by these students, that "African culture" allowed some forms of sexual violence, effectively silenced me: as a white person I did not feel able to challenge an African man about his construction of "his culture"; but as a woman I was outraged that a man could publicly defend violence against women.

In raising these issues with members of the Committee, we were able to isolate a number of different issues. The first was to look critically at the way in which "culture" was being presented as immutable, unchanging, and unchallengeable. We felt strongly that this notion needed to be debunked. In further discussion forums, I was able to challenge this presentation of "culture", and to stress that "culture" is learned and hence changeable.

Secondly, we were concerned that the underlying suggestion in discussions concerning "African culture" was that for anyone not African to challenge such a presentation was for them to engage in a form of racism, or rather a form of racist "cultural imperialism". In response to this the Committee decided it was important to point out the selective way in which cultural integrity was being applied. In order to do this, a challenge put by a white student in one discussion forum was related to students in subsequent forums to good effect:

Racist behaviour has been very much a part of my socialisation - you could say it's one of my cultural practices. Should the University then grant me the right to practice, unchallenged, my "culture" of being racist? (Committee of enquiry into sexual harassment, 1991: 38).

In raising these points in discussion forums, I found that students, who had been reluctant to engage one another in debates around the construction of culture, felt more comfortable about doing so. Frequently lively debates around culture, sexism, violence, harassment and racism occurred in our discussion forums. In particular, I found that if the men making arguments about the cultural acceptability of violence against women were initially challenged by myself, women students felt more comfortable about similarly questioning them. In particular, black women, who previously had tended not to challenge these arguments, began to directly confront the men concerned, arguing that "African culture" was being misrepresented in the forums<sup>18</sup>. Without the educative forums and workshops, it is unlikely that we would have been able to access these debates.

The learning process that I went through during this period - from a feeling of being silenced, to one of being able to engage directly with these questions - was a result of the discussions that we held as a Committee. From this experience, I was able to build these questions into our group discussion research project. Perhaps most importantly, however, this process sensitised the Committee to the need to explore more fully the alienation and anger felt by black students on a predominantly white campus, and to explore the coping mechanisms used by students in this situation.

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<sup>18</sup> Two arguments tended to be made in the forums. The first challenged the notion of a *single* "African culture"; the second disputed the idea that any African culture allowed for the abuse of women.

Further, by observing what kind of arguments were made by students on the basis of gender and racial classification, assumptions that I had made at the beginning of the research process were challenged and changed:

What was particularly interesting [about the discussion on University disciplinary processes with regard to sexual harassment] was that black women appeared to identify themselves first as black students and then as women. ... For me it was interesting because I had up until then seen black women's reluctance to report incidents [of sexual harassment or violence] in terms of coercive control, rather than self-imposed restraint because of a recognition of the high price that would have to be paid by the man concerned, (expulsion from the university, termination of academic career, real economic hardship, family as well as well as individual shame etc). This is a price, it appears, that black women think is higher than the crime. ... [W]hat the evening really did was to demonstrate the narrowness with which I have up to now approached the subject. (Working report to committee of enquiry, April 1990).

In almost all of the education discussion forums, women and men volunteered their own experiences of sexual harassment. Thus, the forums proved to be a valuable way in which to gather information about the nature of students' experiences of sexual harassment and to identify patterns of experiences of sexual harassment and violence. One of our central findings began to take shape during this period, namely that experiences of sexual harassment and violence are affected by race and gender: while men and women, from all races, can experience sexual harassment, the form this harassment takes, and the manner in which it is dealt with is affected by the race and gender of the victim.

## Structured Interviews

In general, the structured interviews of staff members proved to be useful in terms of identifying key areas of concern that needed further investigation. In particular, the direct involvement of residence wardens with students allowed them to reflect on their observations of the behaviour of students, and to relate individual incidents of sexual harassment and violence that had been reported to them. Through the wardens, we were able to develop a picture of many of the "traditions and accepted behaviours" of students in the residence system. Moreover, a number of the wardens were able to report on traditions and practices that students were unlikely to volunteer themselves, and which an outside observer would not have had access to. These included the showing of pornographic movies in some of the men's residences on a regular basis to either a restricted (leadership within the residence) or a more open audience; and the "Dog's-Ball". This was an event held in one of the men's residences in which the residents invited (without their knowledge) the most conventionally unattractive women that they knew. During the course of the evening, with appropriately cryptic comments, an award was presented to the man with the "ugliest" partner.

Many of the wardens were able to provide valuable insights into student behaviour based on their experience of dealing with problems that had arisen in the residences. A number of the wardens suggested that there were direct links between alcohol abuse and disciplinary problems, including sexual harassment and violence. One warden argued that in his opinion some students deliberately get drunk in order to engage in behaviours that they know are wrong:

I think that sometimes this abuse of alcohol is quite deliberate ... quite conscious. ... [It happens] almost as a release mechanism ... Getting drunk in a sense gives [students] permission to do things

they wouldn't normally do [because] they can say afterwards, "I didn't mean it, I didn't know what I was doing, I was drunk".  
(Working report to committee of enquiry, April 1990).

Insights such as these were useful in designing our questionnaire and developing the focus discussion groups for students. They highlighted key areas that needed further investigation with students.

## Observation

Observation was an important aspect of the research work. It allowed me to develop an understanding of the complexity of social relations between students, by observing their interactions, or lack thereof. In particular, the observation process was useful in revealing the way in which race and gender intersect. For instance, I went down to the residence halls at meal times during Orientation Week and twice observed a group of white men sitting outside commenting on the physical and sexual attributes of women students as they went to eat their meals. They only commented on white women. When black women walked past, the group fell silent.

The process of observing students in social situations challenged one of my most strongly held preconceived notions about sexual harassment, that only women can be sexually harassed:

She appeared to be very drunk - slurring her words and her movements were very clumsy. She kept trying to wrap herself around one particular male student who looked decidedly uncomfortable because of her attentions. She kept putting her arms around him and trying to kiss him - at one point she pushed him so hard he fell to the ground with her on top of him. He kept saying "Come on, stop it now" and she kept asking him to kiss her. He'd push her to one side and go back to his group of friends. She'd sit

on the ground (or stand to one side) looking a little dazed and then go back to him, pull him away, and the whole process would start over again. His friends found it very amusing, egging both him and her on. It was an interaction that I had not expected, and found really disturbing. (Working report to committee of enquiry, April 1990)

In trying to understand why I had found this interaction "disturbing", I had to reflect on the way in which peer pressure influences, or rather limits, the way in which both men and women interact with one another. While both men and women can be harassed, the way in which they experience that harassment differs.

### Questionnaires

From our study we concluded that questionnaires were of limited value as a research tool when researching a complex social problem, as we were unable to develop a questionnaire that allowed us to explore the nuances of students experiences of, and attitudes towards, sexual harassment. These nuances, subtleties, and qualifications were of the most value in our study, and we were only able to explore these in interviews or discussion forums with students.

In addition, the questionnaire response rate was so low, particularly in relation to male participants, that the results could not be considered statistically significant.

Further, this approach was found to be flawed in relation to measuring the extent of sexual harassment. We were unable to develop a questionnaire that allowed us to include the diversity of experiences encompassed under sexual harassment. In the absence of this, we felt that students' reluctance to label experiences as sexual harassment (as had been demonstrated repeatedly in the education discussion forums) would render the questionnaire responses inaccurate, in terms of measuring the extent of sexual harassment on campus. The questionnaire study

was, however, useful in assisting us to identify what behaviours students labelled as sexual harassment.

### Focused discussion groups

We concluded that the focused discussion groups were the most successful aspect of our research project. Through them, we were able to develop a clear understanding of students' attitudes towards sexual harassment and violence, and attitudes towards university authority. The major advantage of these discussion groups was that a trained research assistant was able to engage directly with students around the issues that were of interest to us.

Investigation of a complex social phenomenon such as sexual harassment is facilitated when questions of clarification are able to be dealt with immediately. Students were able to qualify their responses to questions, which allowed us to develop a much better understanding of the way in which students constructed the concept of sexual harassment for themselves. In other words, through direct engagement with students we were able to learn what factors students regard as important in terms of determining what sexual behaviour is appropriate and what is inappropriate.

### Telephone-in

During the three days that we ran the telephone-in we received fifteen calls. The fifteen experiences reported to us did not differ from the sort reported during the education forums, or in the individual interviews.

The low response rate suggested either that sexual harassment was not a problem at the University, or that this research method was unsatisfactory. From our previous research work, we were aware that sexual harassment and violence were

a problem on campus, which meant that we had to more closely examine the research approach.

In retrospect, the timing of the telephone-in was not well chosen: it was held at the end of the year, when most staff members and students were preparing for examinations, which partially explains the low response rate. However, perhaps most importantly, as in the design of the questionnaire, we were unable to name the myriad of experiences that constitute sexual harassment. In the absence of being able to do this, we had to rely on participants labelling their individual experiences as sexual harassment, and regarding them as serious enough to report to us. Our assessment lead us to conclude that research approaches that relied on this, were unlikely to be successful.

### Research Interviews

The educative discussion forums allowed me to be closely and publicly identified by students with the issue of sexual harassment. As a result a number of students informally approached me on campus to discuss their own experiences of sexual harassment. Out of this we were able to develop a clearer understanding of the nature of students' experiences of sexual harassment and violence on campus.

However, during the course of my work, it became apparent that while white students appeared to feel comfortable approaching me, black students did not. Further, in discussions with white students about sexual harassment I felt I could identify with the stories that were reported to me as they resonated with my own understanding and experiences. In listening to some of the individual stories related by black women in the education discussion forums, I felt no such familiarity.

In raising these questions with the Committee, it was decided to seek the assistance of an African woman researcher, in order to overcome these perceived barriers. A researcher<sup>19</sup> was requested to conduct a series of individual interviews with self-selected black women to discuss their experiences of sexual harassment and violence at UCT. Her success in encouraging black women students to speak to her, suggested that this research approach was a valid one to adopt.

In reflecting on this success, an important factor emerged with regard to the research process, namely that establishing a rapport with the research subjects is crucial. Personal experiences of sexual harassment and violence are issues which are not easily discussed with strangers. A level of trust is needed for open discussion that is more likely to be achieved if the subject feels able to identify as closely as possible with the researcher. For this reason, in running our discussion group forums we trained a diverse grouping of students, male and female, black and white students, in order that the group facilitator would be able to establish a rapport with the group he/she was running<sup>20</sup>.

## **Conclusion**

In this chapter I have outlined the different research methods used by the Committee, and the reasons that we used them. I have also separately evaluated the individual components of the research project. In the final chapter, I will summarise what we learnt from our experience of undertaking research into sexual harassment at the University of Cape Town.

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<sup>19</sup> The researcher has indicated her desire to remain anonymous.

<sup>20</sup> Most of the discussion groups tended to be relatively homogeneous: male or female, black or white - reflecting the composition of the residences the students were drawn from. Only one group had a mixture of men and women, black and white students. While five of the single gender groups were racially mixed, they tended to have a single race (black or white) in the majority. Two groups consisted entirely of black men.

## Chapter Six

### CONCLUSION

Things have changed [at UCT] now. It's not as much fun as it used to be. Before we could do what we liked. Now when we approach girls on campus we have to be careful. If they don't like what we say or do they say "Watch it! That's sexual harassment and if you don't stop we'll report you to the Committee". (Working report to committee of enquiry, May 1991).

Our research project was required to develop an understanding of what forms of sexual harassment and violence were taking place at the University of Cape Town, and to make recommendations to the Vice-Chancellor about ways in which they could be dealt with. The challenges we faced in achieving this were many.

Sexual harassment is a complex social phenomenon, over which there continues to be definitional ambiguity. While no-one at the University argued that sexual harassment should be tolerated by the institution, many refused to believe it happened at UCT, and insisted we were "making a big issue out of nothing". Given that incidents of *quid pro quo* harassment are generally hidden from public view, and environmental harassment is frequently dismissed as "trivial" or "normal", this was not surprising. We found that many victims of harassment were reluctant, sometimes even scared, to discuss their experiences. We also found that a great many people were either unwilling or unable to label their own experiences, which could be included in a theoretical definition of sexual harassment, as such.

The context in which we were working presented further complications. UCT has a diverse student population, with an active student movement. The governance structures of the University do not reflect the student body, being made up almost entirely of white men. In a racially divided country, this situation resulted in many

students, particularly black students, viewing the authority of the University, at best, with suspicion, at worst, rejecting it outright. As an officially constituted University Committee of Enquiry, we were viewed (and were) a part of the University Administration. Given the above context, this created some problems in terms of working with students, particularly black students.

We found that the particular focus of our research project, sexual harassment and violence between students, was a relatively new area of work. We could find no similar studies from which to draw, which meant that we had to develop and design our own, original research programme. As outlined in the previous chapter, some of the research projects we ran were very successful, while others proved to be less so. However, even those projects which in themselves did not contribute greatly to our research findings, proved to be valuable in terms of furthering our understanding of appropriate research methods for investigating sexual harassment and violence. In this concluding chapter, I will summarise what we learnt from our experience of undertaking research into sexual harassment at UCT.

### **The importance of education and advocacy.**

When I first began to work for the Committee, I did not realise the potential the research process itself had as a tool for education. I held a very "traditional" view of research, believing that "research" and "education" were mutually exclusive processes. At the beginning of the research process, I found that it was not possible to rigidly separate out these two roles, as many students did not understand what was meant by "sexual harassment". When I was approached by a house committee to present a workshop on sexual harassment to students in the residence, I did not view this as an integral part of our research. However, as discussed previously, the debates, discussions, and questions generated at this workshop proved to be very useful in our research.

Through this initial, and subsequent, workshops I was alerted to areas that needed further investigation, such as the need to understand the intersections between culture and gender in relation to sexual harassment. The education forums assisted us greatly in overcoming the problems of labelling associated with undertaking research into sexual harassment, as I was able to "name" and discuss the problem of sexual harassment directly with students. In these forums, a number of individual experiences of sexual harassment were related by students as they illustrated points that they were making in discussion, or when they sought confirmation that their experiences constituted "sexual harassment" under the University's policy. Moreover, other students sought me out after the forums to discuss their experiences.

The forums were also useful in terms of breaking down "silences" that existed around sensitive issues that students did not feel comfortable discussing. I found that if I initially articulated an argument, for instance about "culture", other students then felt more able to join in the discussion, or disagree with points being made, hence allowing us to develop an understanding of important issues that up until that point had been surrounded by public silences.

The risk we ran in adopting this approach was twofold. Firstly, that in advocating a particular definition of sexual harassment, and a range of different positions around it (for example, that sexual harassment could not be defended on "cultural" grounds) we might silence potential participants in the research project who disagreed with us. Secondly, that this approach would bias our findings to such an extent that they could not be regarded as credible.

The Committee was engaged in what might be called "policy research". The University had already adopted a policy on sexual harassment, which contained the definition that we used in our educative work. Hence, our educative work was conducted within the framework of our research brief. Moreover, available literature

on undertaking research into sexual harassment suggested that one of the major problems faced by researchers is breaking the silence that surrounds it (Fitzgerald, 1990). The reluctance of research subjects to speak about their own experiences of sexual harassment is not only self-imposed (in the sense of research subjects being embarrassed or scared) but also because subjects are frequently not able to label or name their experiences:

When an outrage has been so long repressed, there will be few social codifications for its expression. Depending upon who is asking them and how, victims may initially say (and believe) that they are not victims, so near is the denial to erasure. (MacKinnon, 1979: xii).

In this context, we felt that a research priority was the need to break the silence that surrounds sexual harassment. Education and advocacy was viewed as an essential means of achieving this. In other words, while we were aware of the risks we incurred in adopting this strategy, we could see no alternative.

Further, I do not believe that our emphasis on education and advocacy either prevented alternative viewpoints to our own being expressed, or resulted in our findings being distorted. In part, this was precisely because we were aware of the risks we were incurring, and so took precautions to mediate against them. At all of the educative forums a range of different view points were expressed by participants. I took care to ensure that I did not dominate the proceedings. My participation was limited to a short introduction on sexual harassment, and then responses to questions from students. The participants were encouraged to discuss issues raised amongst themselves, and I intervened only when they were either unable or unwilling to do so.

Finally, the educative forums were only one aspect of a multi-faceted research approach. As we were not reliant on a single research method, we could be more

flexible in the way in which we conducted the individual components of the research project as we had built in integrity checks and balances through the multi-research method. The way in which this was achieved is discussed in the section below.

### **The importance of a multi-method research approach.**

As was demonstrated in the previous chapter, a range of research methods were used to collect the data on the basis of which our analysis of sexual harassment was made. In important respects, the different research methods yielded substantially similar results.

For instance, the analysis of questionnaire responses confirmed my impression from the educative forums that there was little consensus amongst students about the definition of sexual harassment. The focused discussion groups demonstrated that many of the attitudes towards sexual harassment, articulated by individual students in the educative forums, were shared amongst a broad range of students. My observation of students during Orientation Week confirmed the impression related by many residence wardens in the structured interviews, that the culture of UCT was one that tolerated, and at times, encouraged sexual harassment. The experiences of sexual harassment recounted in the questionnaire responses, the telephone-in, the individual interviews and by "drop-by" students, did not vary greatly.

While the results of the individual components of the project tended to confirm one another, the different research methods each provided a particular perspective on the problem we were addressing. For instance, the questionnaires identified the specific points of disagreements between students around the definition of sexual harassment, while the focussed discussion groups allowed us to explore the reasons for them. This enabled us to develop a more complete understanding of the complexity of social interactions between students.

### **The importance of directly engaging subjects in the research process.**

The central problem that we had to overcome in investigating the nature and extent of sexual harassment concerned the question of labelling. This was further complicated by the issue of definitional ambiguity. We concluded from our research that those research methods that allowed trained researchers to engage directly with research subjects were the most successful ones to adopt.

In those situations where participants were able to qualify their responses to our questions, and to ask questions of their own, we were able to develop a much clearer understanding of the ways in which participants constructed the concept of sexual harassment, and the reasons behind their constructions. In addition, we found that the expression of nuances, subtleties, and qualifications of subjects' attitudes and experiences were of the most value in our study. We were only able to explore these when we were able to directly engage with subjects in our research process.

### **The importance of a diversive team of researchers.**

While I was responsible for undertaking the research work of the Committee, Committee members met regularly in order to plan the research to be undertaken, and to discuss the research results. Through these discussions, my own personal perspectives and perceptions were mediated by other viewpoints. This process was strengthened by the diversity of the composition of the Committee. The Committee (including myself) consisted of one black woman, two white women, and one white man and there was a race and gender mix among our student research assistants. As Faithorn (1986: 275) has commented:

Try as hard as we might, it is still not possible to go into another culture completely free of the one into which we were first socialized, and this can have a profound and often unrecognized effect on the results of our research. Where we look for information, who we talk

to about what, how we interpret what we see and hear, even what we think of to question, can all be influenced by our own cultural conditioning. Whether our research focus happens to be on matters of gender and sex role or not, our own concepts of femininity and masculinity and learned role behaviors as women and men do impinge on our fieldwork.

In discussing the research results, the diversity of the "team" of researchers (the Committee members and student research assistants) ensured that fewer subtle biases in terms of race and gender went unchecked. In addition, in analysing the research results I found it useful to be able to draw on the experiences of the men and black members of the research team to better understand the actions and attitudes of black and men participants in our research project. In particular, however, the diversity of the group of researchers assisted in the design and implementation of our research programme. For instance, in the original proposal on the focused discussion groups which I compiled, there was too great an emphasis on student leisure activities in which black students tended not to participate (such as RAG events). Through discussions with the student research assistants<sup>1</sup>, we amended the range of questions asked to better reflect the diversity of student experiences at the University.

To suggest that researchers are unable to move beyond their own individual experiences, to effectively explore or understand "other" experiences, would be to overstate the argument. However, through my work on the Committee, I came to recognise the extent to which my own experiences influenced what questions I asked, and filtered both the responses and silences that I encountered from research subjects. As this process was most often unconscious, I found the participation of a diverse team of researchers within our project to be invaluable.

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<sup>1</sup> These discussions were held at the training programme we ran for the research assistants prior to the focused discussion group project.

## Conclusion

Our Committee was required to undertake policy research into the question of sexual harassment at the University. As discussed previously<sup>2</sup>, Room (1986: 56) asks whether specific strategies can be adopted in order to use the research process to

- Induce social change in a manner which provides the disadvantaged with an awareness and/or vision of an alternative social order;
- Help the disadvantaged reflect on their position to expose unrecognised and detrimental experiences of power;
- Expose the consequences of the actions of more advantaged groups;
- Enable the disadvantaged to develop policies and programmes to counter this experience of power.

The Committee was established following the distribution of an anonymous pamphlet that claimed that sexual harassment and violence were widespread on the campus. Of concern was not only the validity or otherwise of the claims, but the reasons that had prompted the use of an anonymous pamphlet as a means of conveying the allegations contained within it, as well as the reasons why students felt unable to use the available disciplinary channels (such as the Panel on Sexual Harassment) for reporting and/or resolving such incidents. When we initially began our work, we found that most students did not know what sexual harassment was, and were unaware of the University's policy on it. We found that many victims of sexual harassment were unwilling or unable to label their experiences as such, and were reluctant to report incidents of harassment, either to ourselves or to the Panel on Sexual Harassment.

Over the eighteen months that we conducted our research, we observed some significant changes in this situation. Perhaps one of the most gratifying comments to

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<sup>2</sup> See Chapter Four: 61-62.

be reported to me was from a friend working in a bursary office in Cape Town, following an interview with a UCT student in 1991. When asked how he was enjoying being at the University he replied

Things have changed there now. It's not as much fun as it used to be. Before we could do what we liked. Now when we approach girls on campus we have to be careful. If they don't like what we say or do they say "Watch it! That's sexual harassment and if you don't stop we'll report you to the Committee". (Working Report to the committee of enquiry, May 1991).

I believe the above comment is illustrative of the extent to which there was an increased understanding of sexual harassment, and the protection offered by the University, within the student body at UCT during the time that we conducted our research. Further, in 1993, the Equal Opportunity Research Project conducted a survey of students entering UCT. It was found that 86 percent of respondents were aware of the University's harassment policy. Fifteen percent of women respondents and 3 percent of men, reported being made to feel uncomfortable because of their sex. Twenty percent of the respondents reported their experience to a University official. (EORP Orientation week working report, November 1993). In the Committee's survey of students in 1990, 36 percent of women respondents reported experiencing some form of sexual harassment. No respondents reported their experience to a University official<sup>3</sup>.

These results suggest both that there are fewer incidents of sexual harassment occurring at UCT, and that more students are willing to use the available channels open to them, if they do experience some form of harassment. While this change

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<sup>3</sup> The results of the Committee's questionnaire cannot be considered statistically significant as the response rate from the overall sample was too low. However, of the 400 questionnaires distributed within the women's residences, 205 were returned, suggesting that the figures presented here, which refer only to women respondents, are significant.

cannot be attributed solely to the work of the Committee, I believe the work that we did, and the way in which we did it, went some way towards achieving the goals of action research set by Room.

Sexual harassment remains a "perplexing and persistent problem" in South Africa and elsewhere (Welzenbach, 1986: 1). Increasingly research into this social problem is being conducted in South Africa, and we are expanding our knowledge of both why it happens, and effective ways in which to deal with it. It is hoped that the experience of the Committee of Enquiry into Sexual Harassment at UCT, will prove useful to researchers by suggesting alternative research strategies that may allow the problem of harassment to be addressed through the research process, and not only through research findings.

University of Cape Town

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University of Cape Town

The names of the students accused of rape in the pamphlet have been deleted.

# RAPISTS BEWARE!!!

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

AND OTHERS:

YOU'VE STRUCK THE WOMEN, YOU'VE STRUCK A ROCK,  
WOMEN ON THIS CAMPUS SHALL NOT BE INTIMIDATED,  
WOMEN RESERVE THE RIGHT TO WALK AROUND AS THEY PLEASE,  
WOMEN SHALL ORGANISE, MOBILISE AND

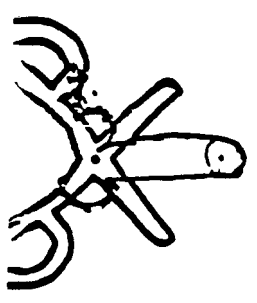
Some men on this campus have declared war against women. They have claimed the right to decide where women should be and when. They are dictating to women what they should wear and how they should live their lives.

They are harrasing, assaulting and raping the women of UCI. Little or no publicity has been given to cases reported to Administration. Some weeks ago a case was reported to the authorities, their response has been to play delaying tactics. They have shown this by labelling the case as an assault case. How ridiculous!!! Especially from an Administration that is supposedly espousing the principle of NONSEXISM. The truth is : \_\_\_\_\_ IS GUILTY OF ATTEMPTED RAPE and nothing else. What he deserves is to be CASTRATED, with ALL other RAPISTS!!!!

To you ~~damper~~, ~~harrasing~~, ~~assaulting~~ and ~~raping~~.....

## BEWARE!!!!!!

"THE EYE OF CASTRATION IS WATCHING YOU"



**TERMS OF REFERENCE:  
Committee of Enquiry into Sexual Harassment  
at the University of Cape Town.**

1. The Committee of Enquiry shall be concerned with the attitudes, traditions and accepted behaviour in the student body and the University as a whole that relate to the development of infringements of the University's policy in regard to sexual harassment.

2. It shall have a particular concern for the situation in the residences, particularly in regard to fears on the part of women in residence, their security and exposure to sexual harassment and sexual molestation.

3. It shall report on:

(a) whether as a matter of policy university authorities should lay charges with or report allegations to the police where they have evidence or know of allegations of sexual harassment or sexual molestation that may constitute criminal action; and

(b) how the university authorities should deal with:

(i) abuse which may constitute *crimen injuria*;

(ii) abuse which may give grounds for a civil action by or against a student.

4. It shall make any other investigation and recommendation that it seems fit in relation to the general matter of sexual harassment and molestation on the university campus.

## POLICY AND PROCEDURE ON SEXUAL HARASSMENT

### *Policy*

- 1 Sexual harassment is a form of discrimination and is unacceptable to the University. It will not be tolerated.

We define sexual harassment as requests for sexual favours, or unwelcomed, or repeated or flagrant sexual advances, or demeaning verbal or other expressive behaviour of a sexual nature when:

submission is made either explicitly or implicitly a term and condition of an individual's employment or status as a student; or

submission or rejection by an individual is used as a basis for employment or academic decisions affecting him or her, or for awarding or withholding favourable employment or academic opportunities, evaluations or assistance; or

its purpose or effect is interference with the individual's performance at work or in study by creating an intimidating, hostile or offensive environment in which to work or learn.

### *Remedies*

- 2 Anyone who feels that he or she is the victim of sexual harassment has the right to seek redress without prejudice. The procedure for dealing with complaints has two stages. The first stage is informal and the second formal.

### *Informal procedure*

- 3.1 A person who has a complaint *must* try to resolve the problem using the informal procedure. This involves discussion and/or mediation.
- 3.2 Any person (student or member of staff) who has been sexually harassed *should* first try to resolve the problem through discussion.

- 3.3 However, there will be cases when discussion between the parties will present particular stress and difficulties. In these cases, or when discussion fails to resolve the problem, a person who wants to pursue a complaint *must* seek the counsel, mediation and intervention of an appointed mediator. The appointed mediator has ten working days in which to provide help and seek a satisfactory solution. If there has been no resolution to the complainant's satisfaction within ten working days, the complainant may institute formal proceedings. (See section 4).

### *Access to Mediators*

The Registrar will publicise annually the names of mediators who will be available to students and staff through appropriate campus media and publications.

In addition, the names of mediators may be obtained in confidence from the offices of:

- (a) The Registrar
- (b) The Deputy Registrar – Personnel
- (c) Deans of faculties
- (d) Faculty Officers
- (e) Student Affairs and Student Health Services
- (f) Students' Representative Council

The complainant has the right to choose from the list of mediators.

### *Confidentiality*

Records and complaints filed, action taken to remedy the problem, the names of those involved, and the outcome, will be maintained by the appointed mediators. No record of the informal stage will be maintained on the personnel files of individuals. Mediators will report annually to the Officer nominated by the Vice-Chancellor for this purpose.

- 3.6 Anonymous complaints will not be entertained or acted upon. The rights of complainants will be protected, as will the rights of those complained against.

### *Formal procedure*

- 4 In cases where the mediator is not able to resolve the complaint within ten days, the complainant may lodge a written complaint with the Vice-Chancellor's Office.

The Vice-Chancellor, or nominee, shall thereupon –

- 4.1 call for a report from the mediator;
- 4.2 invite the person complained against, if he or she wishes, to state his or her case in writing;
- 4.3 deal with the matter in terms of the disciplinary provisions applicable (staff or student provisions).

### *Appointment of mediators*

- 5.1 The Vice-Chancellor, or a nominee, will be responsible for appointing a panel of mediators, and will attempt to recruit people from a wide range of University constituencies.
- 5.2 Vice-Chancellor, or a nominee, will arrange for the training of mediators for this purpose.
- 5.3 Mediators will usually be appointed for three years.



1. What faculty are you in?  
(please circle the correct response)

Arts      Social Science      Medicine      Commerce      Education  
Engineering      Fine Art and Architecture      Law      Music  
Science

--	--

2. What year are you in?  
(please circle the correct response)

1st      2nd      3rd      4th      5th      6th


3. Have you ever been in a UCT residence?      Yes / No

3.1 If you answered "yes" what residence were/are you in?  
(please circle the correct choice)

Fuller      Smuts      Driekoppen      Baxter      Tugwell      Leo Marquard  
Rosebank      Kilindini      Glenres      The Woolsac      Groote Schuur  
University House      Wolmunster      Medical Residence

--	--

Other \_\_\_\_\_

3.2 If you answered "yes" did you attend the residence  
Orientation Week programme?      Yes / No


4. What is your gender?      Female / Male

5. What is your "racial" classification? \_\_\_\_\_

6. What school did you attend? \_\_\_\_\_

6.1 Was it a Government school?      Yes / No

6.2 Was it a single-sex school?      Yes / No

6.3 Was it a single-race school?      Yes / No


7. How old are you?  
(please circle the correct choice)

under 18      18 - 20      21 - 23      over 23

--



10. Since arriving at university have you been:  
(please tick the appropriate choice/choices)

(A) repeatedly propositioned in an unwelcome manner?

yes / no

(B) touched in an uninvited and sexual way?

yes / no

(C) the object of sexual or sexist jokes or comments?

yes / no

(D) forced to engage in sexual activities without your consent?

yes / no

(E) propositioned by a lecturer who has offered you higher marks in return for sexual favours, or threatened to lower marks if you have not complied?

yes / no

(If you answered "yes" to more than one of these, when answering the following questions, please indicate to which one you are referring by using the appropriate letter/s: ie A, B, C, D or E)

11. If you answered "yes" to any of the above, how often did this happen?

(please tick appropriate response/s; or put the correct letter/s from above in the space provided)

once

\_\_\_\_\_

occasionally

\_\_\_\_\_

frequently

\_\_\_\_\_

12. If you answered "yes" to any of the above, where did this happen?

(please tick appropriate response/responses, or put the appropriate letter/s from above in the space provided)

during the time you spent in residence

\_\_\_\_\_

if "yes" then was it:

during Orientation Week

\_\_\_\_\_

walking to meals

\_\_\_\_\_

in the residence pub

\_\_\_\_\_

at a party in residence

\_\_\_\_\_

other (please specify)

\_\_\_\_\_



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--	--


Comment: \_\_\_\_\_

outside of residence \_\_\_\_\_

--	--

if "yes" then was it:

on campus \_\_\_\_\_

--	--

in a lecture theatre \_\_\_\_\_

--	--

at a "Rag" function \_\_\_\_\_

--	--

at an "Intervarsity" function \_\_\_\_\_

--	--

at an "SRC" organised event \_\_\_\_\_

--	--

other (please specify) \_\_\_\_\_

--	--

Comment: \_\_\_\_\_

General Comments (if any) \_\_\_\_\_

13. If you answered "yes" to any of the above, did you tell anyone? yes / no

--	--

13.1 If not, why not? (please tick correct choice/choices, or use the appropriate letters in the space provided)

didn't know who to tell \_\_\_\_\_

--	--

didn't want to make a fuss \_\_\_\_\_

--	--

didn't think it was serious enough \_\_\_\_\_

--	--

didn't want to look foolish \_\_\_\_\_

--	--

other (please specify) \_\_\_\_\_

--	--

-13.2 If you did tell someone, who was it?

- a friend/s \_\_\_\_\_
- a house committee member \_\_\_\_\_
- parents \_\_\_\_\_
- warden \_\_\_\_\_
- the panel on sexual harrassment \_\_\_\_\_
- other (please specify) \_\_\_\_\_


14. If you answered "yes" to any of the questions, was the person/persons who engaged in this (please tick all those responses you agree with, or use the appropriate letter/s in the space provided)

- on his/her own \_\_\_\_\_
- in a group \_\_\_\_\_
- drunk \_\_\_\_\_
- a first year student/s \_\_\_\_\_
- older than you \_\_\_\_\_
- of the same sex as yourself      yes / no \_\_\_\_\_
- of the same "racial" group as yourself      yes / no \_\_\_\_\_
- a lecturer \_\_\_\_\_
- a tutor \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_


If you would like to discuss any of these questions, or your answers, please 'phone Carla Sutherland at 650-3476. All meetings will be treated in confidence.

If you have heard of, or experienced any incidences of sexual harrassment that you wish to discuss, it would be of enormous help to the Commission if you would come forward.

Thank you, once more, for your assistance.

## **5 MINUTES OF YOUR TIME COULD MAKE ALL THE DIFFERENCE**

The Committee of Enquiry into Sexual Harassment is investigating the nature and extent of harassment at UCT.

\*If you have experienced anything that you think is sexual harassment, tell us about it. It might be something very serious, it might be something small, but if it made you feel uncomfortable or angry, call us.

\*If you have questions about what sexual harassment is, or complaints about the University's policy, call us.

5 MINUTES IS ALL IT TAKES TO MAKE A PHONE-CALL

**Call us at 650-3476**

**Wednesday 24th April to Friday 26th April**

**Phone anytime between 10am and 10pm**

**ALL CALLS WILL BE  
ANONYMOUS AND CONFIDENTIAL**

Committee of Enquiry into Sexual Harassment

### **SICK OF SEXIST JOKES?**

You've heard them all before and you know that it isn't really serious. After all it's only good natured fun, or too silly to make a fuss about. But let's call it what it is: sexual harassment.

If you're tired of the jokes and comments: Tell us.

### **"I WANTED TO SAY 'NO'. BUT I COULDN'T..."**

How do you say "no" to your boss, supervisor, teacher or tutor? If someone in a position of authority is making you feel uncomfortable with unwanted sexual attention: Tell us.

### **TOO SCARED TO TELL?**

Rape and Battery are frequent crimes. They usually go unreported.

Maybe it's happened to you. Maybe you've never told anyone. But because of the silence, lots of people think rape and battery don't happen.

If you've been a victim of sexual violence: Tell us.

### **OUT OF THE CLOSET, AND INTO THE LION'S DEN**

Queers, poofers, moffies, dykes and queens.

Just words? Or powerful prejudices?

If you're being hassled or threatened because of your sexual orientation: Tell us.

### **BREAK THE SILENCE**

**Call us at 650-3476**

**Wednesday 24th April to Friday 26th April**

**Anytime between 10am and 10pm**

**ALL CALLS WILL BE  
ANONYMOUS AND CONFIDENTIAL**

Committee of Enquiry into Sexual Harassment