

SPECIES	HAB	ST	FG
ASHY-CROWNED SPARROW LARK <i>Eremopterix grisea</i>	S	R	I
RUFOS-TAILED LARK <i>Ammomanes phoenicurus</i>	S	R	I
PALE-BILLED FLOWERPECKER <i>Dicaeum erythrorhynchos</i>	D,M	R	NF
PLAIN FLOWERPECKER <i>Dicaeum concolor</i>	D,M	R	NF
PURPLE-RUMPED SUNBIRD <i>Nectarinia zeylonica</i>	S,D	R	N
CRIMSON-BACKED SUNBIRD <i>Nectarinia minima</i> 1	M	R	N
PURPLE SUNBIRD <i>Nectarinia asiatica</i>	S,D	R	N
LOTIEN'S SUNBIRD <i>Nectarinia lotenia</i>	M	R	N
LITTLE SPIDERHUNTER <i>Arachnothera longirostra</i>	M	R	NI
HOUSE SPARROW <i>Passer domesticus</i>	S,D	R	G
CHESTNUT-SHOULDERED PETRONIA <i>Petronia xanthocollis</i>	S,D	R	G
FOREST WAGTAIL <i>Dendronanthus indicus</i>	M	M	I
WHITE WAGTAIL <i>Motacilla alba</i>	S,D,M	M	I
WHITE-BROWED WAGTAIL <i>Motacilla maderaspatensis</i>	S,D	R	I
CITRINE WAGTAIL <i>Motacilla citreola</i>	S	M	I
GREY WAGTAIL <i>Motacilla cinerea</i>	M	M	I
PADDYFIELD PIPIT <i>Anthus rufidus</i>	S	R	I
TAWNY PIPIT <i>Anthus campestris</i>	S	M	I
LONG-BILLED PIPIT <i>Anthus similis</i>	D,M	R	I
TREE PIPIT <i>Anthus trivialis</i>	D,M	M	I
OLIVE-BACKED PIPIT <i>Anthus hodgsoni</i>	M	M	I
STREAKED WEAVER <i>Ploceus manyar</i>	M	R	G
BAYA WEAVER <i>Ploceus philippinus</i>	S,D	R	G
RED AVADAVAT <i>Amandava amandava</i>	M	R	G
INDIAN SILVERBILL <i>Lonchura malabarica</i>	S,D,M	R	G
WHITE-RUMPED MUNIA <i>Lonchura striata</i>	S	R	G
BLACK-THROATED MUNIA <i>Lonchura helaarti</i>	S,D,M	R	G
SCALY-BREASTED MUNIA <i>Lonchura punctulata</i>	S	R	G
BLACK-HEADED MUNIA <i>Lonchura malacca</i>	S,D,M	R	G
COMMON ROSEFINCH <i>Carpodacus erythrinus</i>	S,D	M	G

Bird records from Similajau National Park, Sarawak

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Similajau National Park is a 71 km² coastal park in Sarawak, Borneo, consisting of mainly pristine lowland mixed dipterocarp forest, bounded north and south by rivers with small areas of mangroves at their mouths. Birds were surveyed in the park for six weeks in August - September 1986 and three weeks in September 1995. About 230 species were found, a total almost as high as for any surveyed site in Borneo, and reflects the joint presence of coastal and forest habitats, good habitat condition and the high survey effort. There was no evidence of major change in bird communities between the two years, although during the intervening nine-year period the park was opened for tourists and much of the surrounding Similajau Forest Reserve had been felled. The stationing of permanent park staff seems to have deterred hunting. Over 70 (30%) of the species were recorded in only one of the two years; for most of these a contributory factor to this pattern could be suggested. It is likely that many further species remain to be found.

Records of Grey-streaked Flycatcher *Muscicapa griseisticta* and Grey Imperial Pigeon *Ducula pickeringii* may be the first from Sarawak. Twenty species were considered Globally Threatened or Near-threatened by Collar *et al.* (1994). The only Globally Threatened species seen regularly in both years was Wrinkled Hornbill *Aceros corrugatus*; fireback sp. *Lophura*, Bornean Ground Cuckoo *Carpococcyx radiatus*, Grey Imperial Pigeon and Storm's Stork *Ciconia stormi* were seen once each. Among Near-threatened species, populations of Red-crowned Barbet *Megalaima rafflesii*, Black Hornbill *Antracoceros malayanus*, Black Magpie *Platysmurus leucopterus*, Bornean Bristlehead *Pityriasis gymnocephala*, Hook-billed Bulbul *Setornis criniger* and Grey-breasted Babbler *Malacopteron albugulare* are all large. Malaysian Plover *Charadrius peronii* had apparently left the area, probably because of the greatly increased disturbance in the park's estuaries; Blue-rumped Parrot *Psittinus cyanurus* may also have declined. Various open-country species (none listed in Collar *et al.* 1994) had become more common. The park supports few endemics compared with other Bornean sites; this may be related to its very low altitude. Protection of the birds of the park is aided by the apparent historical absence of hunting and agriculture by local rural people.

INTRODUCTION

Similajau is a small (71 km²) National Park in Sarawak, Malaysian Borneo, located at 3°22'-31'N 113°10'-18'E, 30 km north of the town of Bintulu. It was surveyed for birds between 6 August and 15 September 1986 (Duckworth and Kelsh 1988). Since 1986, large areas of lowland forest have been cleared across Sarawak, increasing the importance of forest remaining in the state's protected areas. Furthermore, although few birds found in 1986 had then been assessed as Globally Threatened with extinction (King 1978-1979), the most recent Bird Red Data book (Collar *et al.* 1994) considered as Globally Threatened or Globally Near-Threatened many species found in Similajau in 1986. This change reflects both the recent and extensive habitat destruction in the Sundaic subregion and a more comprehensive listing of birds under threat: Wells (1985) pointed out that the species then listed in the Red Data

Book were a selection of spectacular, rather than preferentially threatened, forest birds. A repeat visit was therefore made to Similajau National Park during 4–28 September 1995 with two aims:

1. to update information on the status of Globally Threatened and Near-Threatened species;
2. to add to the 1986 inventory, which was clearly incomplete for various groups (nocturnal species, cuckoos, pigeons, ground-living birds and others).

STUDY AREA

Similajau National Park (N.P.) (Fig. 1) was gazetted in 1979, chiefly for the marine turtles breeding on its beaches. Of the three totally protected areas in coastal Sarawak, it is the only one with significant lengths of beach coastline (Kavanagh 1985). Behind the beach, a strip of forest at least 1.5 km wide is also in the protected area. The northern boundary is formed by the eponymous Sungei (= river) Similajau and the southern by the Sungei Likau. The national park is surrounded by the 1,203 km² Similajau Forest Reserve which is currently being logged for commercial timber. However, at least along the Likau, a strip of riverine forest appears to have been left along the bank outside of the national park. Very little forest clearance has occurred within the national park, whose vegetation is almost entirely primary. The park was opened to visitors in 1986 and accommodation and facilities were offered at the park headquarters from the early 1990s.

Most surveyed areas supported mixed dipterocarp forest (hereafter, MDF), approaching *kerangas* (forest on soil too poor to support a rice crop) over large areas. Small areas, both tidal and freshwater, resembled swamp forest. A coastal forest (distinct in its reduced stature and tree species composition) lined the beach, while the estuaries and lower saline reaches of major rivers supported small areas of mangroves and nipah palm. Small areas of secondary growth were present at both ends of the park in 1986; by 1995, their area adjacent to the park had expanded considerably.

Along the coast, long sand beaches are interspersed with low rocky promontories. In Kuala (= estuary) Likau, large areas of mud were exposed at low tide, but most of Kuala Similajau was sandy.

Work concentrated in three areas: around the lower Likau (where the park headquarters (HQ) are now located), at Ulu Likau (the upstream extent of the national park, 5 km by river from the estuary) and around the lower Sungei Similajau. Most observations were made within 2 km of the respective base (Fig. 1), but in 1995, the recently-developed trail network around the lower Likau allowed observations over a larger area, especially along the coast path north of Kuala Likau to the mouth of the Sungei Kabalag, which runs mostly at least 50 m (and often much more) within the forest. Observations were made up to 105 m altitude; the highest point of the park is at only 113 m.

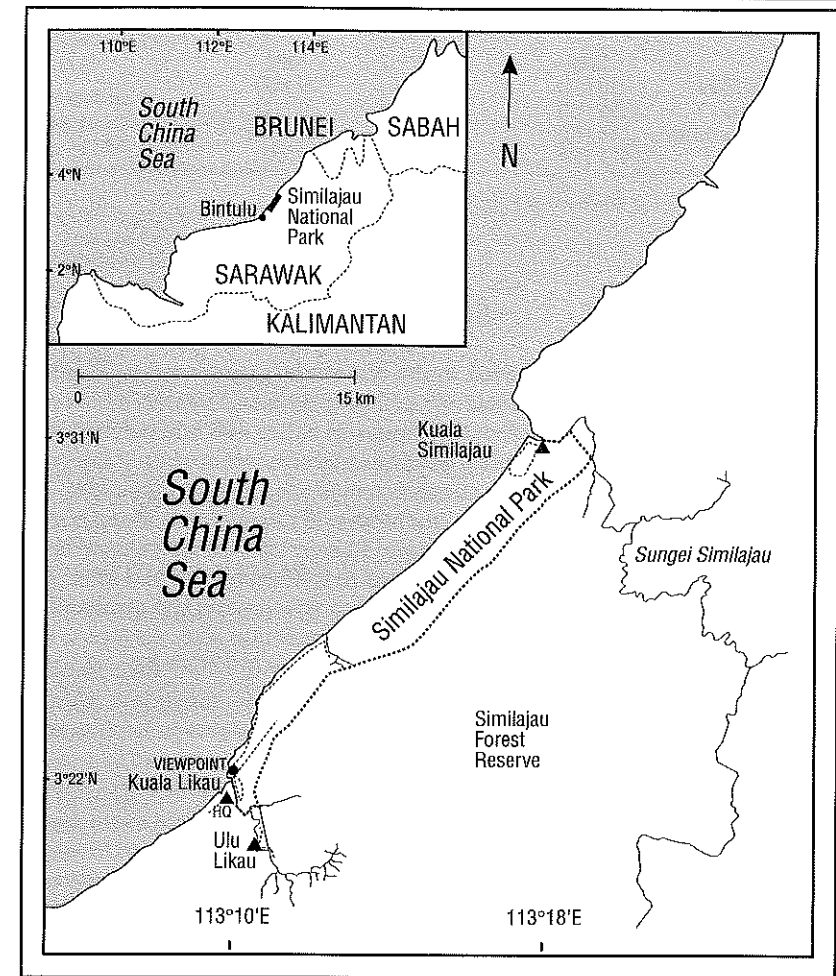


Figure 1. Similajau National Park

METHODS

Most records came from opportunistic forest birding. Active searching was mixed with prolonged watches at productive sites (fruiting and flowering trees, treefall sites, areas with sparse understorey and river-pools). Survey effort is presented in Table 1. In 1986, many incidental observations were made from boats along the Likau and Similajau and considerable time (about 20 days with 19 nets) was devoted to mist-netting. Little information on bird status additional to that from field observations was gathered by the latter method (see Duckworth and Kelsh 1988).

Species	Threat	Habitat	Lower Likau 86 95	Ulu Likau 86 95	Sungei Similajau 86 95	Habitat	Dates
BRIDLED TERN <i>Sterna anaethetus</i>			86 95				1986 1995
WHISKERED TERN <i>Chlidonias hybridus</i>			0* 0				16 Sept 13 Sept
OSPREY <i>Pandion haliaetus</i>			P*		P*		n/r 16 Sept
JERON'S BAZA <i>Aviceda jerdoni</i>	GNT	LS	0 0	0			n/r
ORIENTAL HONEY-BUZZARD <i>Pernis ptilorhynchus</i>		LS	0 0				
BAT HAWK <i>Macheiramphus alcinus</i>		LS	0 0				
BRAHMINY KITE <i>Haliastur indus</i>		Man	C F		C	coas	
WHITE-BELLIED SEA EAGLE <i>Haliaeetus leucogaster</i>		EXLS	C C	0	F	coas	
CRESTED SERPENT EAGLE <i>Spilornis cheela</i>		LS	0 0	0	F		
CRESTED GOSHAWK <i>Accipiter trivirgatus</i>		LS	0 0		0		
BESRA <i>A. virgatus</i>		MS	0				
BLACK EAGLE <i>Ictinaetus malavensis</i>		MS	0		P		
RUFUS-BELLIED EAGLE <i>Hieraaetus kienerii</i>		MS	0				
CHANGAELE HAWK EAGLE <i>Hieraaetus cirriatus</i>		LS	0				
BLACK-THIGHED FALCONET <i>Microhierax fringillarius</i>		ELS	0 C				
DARTER <i>Aphinga melanogaster</i>		Man					
LITTLE EGRET <i>Egretta garzetta</i>	GNT		0*			sec	13 Sept
INTERMEDIATE EGRET <i>Mesophyx intermedia</i>			0		?	r/v	25 Sept
CHINESE POND HERON <i>Ardeola bacchus</i>			0		?	coas/sec	n/r 24 Sept
LITTLE HERON <i>Butorides striatus</i>			F			man	n/r 15 Sept
STORM'S STORK <i>Ciconia stormi</i>			0				
FRIGATEBIRD <i>Fregata</i> sp.	GT	XLS	0				
GARNET PITTA <i>Pitta granatina</i>		XLS	0				
DUSKY BROADBILL <i>Corydon sumatranus</i>		LS	0				
BLACK-AND-RED BROADBILL <i>Cymbirhynchus macrorhynchus</i>		ELS	0				
BANDIED BROADBILL <i>Eurylaimus javanicus</i>		LS	0	P			
BLACK-AND-YELLOW BROADBILL <i>E. ochromialis</i>		LS	C C	C P	P C P		
GREEN BROADBILL <i>Calypotomena viridis</i>		LS	0	F			
GOLDEN-BELLIED GERGONE <i>Gerygone sulphurea</i>		LS	F F	F			
ASIAN FAIRY BLUEBIRD <i>Irena puella</i>		LS	F F	F P			
GREATER GREEN LEARIBIRD <i>Chloropsis sonnerati</i>		LS	F F	F P			
LESSER GREEN LEARIBIRD <i>C. cyanopogon</i>		LS	0	F			
BLUE-WINGED LEARIBIRD <i>C. cochinchinensis</i>		LS	0	F			
TIGER SHRIKE <i>Lanius tigrinus</i>		ELS	0*			sec	19 Sept
BROWN SHRIKE <i>L. cristatus</i>		Man	0			sec	22 Sept
MANGROVE WHISTLER <i>Pachycephala grisola</i>							

Species	Threat	Habitat	Lower Likau 86 95	Ulu Likau 86 95	Sungei Similajau 86 95	Habitat	Dates
BLACK MAGPIE <i>Platysmurus leucopterus</i>	GNT	XLS	F F	0	F		1986 1995
SLENDER-BILLED CROW <i>Corvus enca</i>		XLS	F F	P	C		
BORNEAN BRISTLEHEAD <i>Ptilinopus yaminocephala</i>	GNT	XLS	0				
DARK-THROATED ORIOLE <i>Oriolus xanthoptotus</i>		LS	0				
LESSER CUCKOOSHRIKE <i>Corachna fimbriata</i>		LS	0				
FIERY MINIVET <i>Pterococcyus igneus</i>		XLS	P P	P P	F	man	n/r 9 Sept
BLACK-WINGED FLYCATCHER-SHRIKE <i>Hemipus hirundinaceus</i>		LS	F F	C P			
PIED FANTAIL <i>Rhipidura javanica</i>		Man	P F	C P			
SPOTTED FANTAIL <i>R. pectorata</i>		LS	C C	C P			
CROWN-BILLED DRONGO <i>Dicrurus aeneactis</i>		LS	F	[P]			
BRONZED DRONGO <i>D. aeneus</i>		LS	F				
GREATER RACKET-TAILED DRONGO <i>D. paradiseus</i>		XLS	0 0	0	F		
BLACK-NECKED MONARCH <i>Hypothymis azurea</i>		LS	0 0	F P	F		
ASIAN PARADISE-FLYCATCHER <i>Terpsiphone paradisi</i>		LS	0	0	0		
COMMON IORA <i>Aegithina tiphia</i>		LS	0	0			
GREEN IORA <i>A. viridissima</i>		LS	F F	0 P			
RUFUS-WINGED PHILENTOMA <i>Philentoma pyrroptera</i>		LS	F C	0 P	P		
MOON-BREASTED PHILENTOMA <i>P. velatum</i>		LS	0	0			
LARGE WOODSHRIKE <i>Tephrodornis galardi</i>		LS	0	P			
GREY-CHESTED JUNGLE FLYCATCHER <i>Rhinomyias umbratilis</i>		LS	F	F P	F		
GREY-STREAKED FLYCATCHER <i>Muscicapa griseisticta</i>		LS	0	P			
ASIAN BROWN FLYCATCHER <i>M. dalurica</i>		ELS	P	P			
MUSUMAKI FLYCATCHER <i>Ficedula mugimaki</i>		Man	0				
MANGROVE BLUE FLYCATCHER <i>Cyornis ruficastra</i>		LS	F				
GREY-HEADED CANARY FLYCATCHER <i>Culicicapa ceylonensis</i>		LS	0 F	0 P			
SIBERIAN BLUE ROBIN <i>Luschnia cyane</i>		LS	0 C	0 P			
ORIENTAL MAGPIE ROBIN <i>Copsychus saularis</i>		LS	C C	0 P			
WHITE-RUMPED SHAMA <i>C. malabaricus</i>		LS	0	0			
RUFUS-TAILED SHAMA <i>Trichixos pyropyga</i>		LS	0	0			
CHESTNUT-NECKED FORKTAIL <i>Enicurus ruficapillus</i>		SLS	0 F	F P			
ASIAN GLOSSY STARLING <i>Enicurus ruficapillus</i>		XLS	C C	C P			
HILL MYNA <i>Gracula religiosa</i>		LS	F C	F P			
VELVET-FRONTED NUTHATCH <i>Sitta frontalis</i>		LS	C C	C P			
BARN SWALLOW <i>Hirundo rustica</i>		LS	C C	C P			
PACIFIC SWALLOW <i>H. tahitica</i>		LS	F 0	0			
BLACK-AND-WHITE BULBUL <i>Pycnonotus melanoleucus</i>		LS	0	0			
BLACK-HEADED BULBUL <i>P. atriceps</i>		LS	0	0			

Species	Threat	Habitat	Lower Likau 86 95	Ulu Likau 86 95	Sungei Similajau 86 95	Habitat	Dates
GREY-BELLIED BULBUL <i>Pycnonotus cyaniventris</i>		LS	O	F	O	sec	1986
PUFF-BACKED BULBUL <i>P. eutilotus</i>		LS	O	F	O	man/coas	1995
YELLOW-VENTED BULBUL <i>P. goiavier</i>							
OLIVE-WINGED BULBUL <i>P. plumosus</i>		LS	[P] C	P P	[P] [P]		
CREAM-VENTED BULBUL <i>P. simplex</i>		LS	C	C P	[F] [P]		
RED-EYED BULBUL <i>P. brunneus</i>		LS	O	F	O		
FINSCH'S BULBUL <i>Alphoixius finschii</i>		LS	O	F	O		
GREY-CHEEKED BULBUL <i>A. bres</i>		LS	O	F	O		
YELLOW-BELLIED BULBUL <i>A. phaeocephalus</i>		LS	O	F	O		
HOOK-BILLED BULBUL <i>Setornis criniger</i>	GNT	XLS	O	O	C P		
HAIRY-BACKED BULBUL <i>Tricholestes criniger</i>		LS	C	C P	F		
BUFF-VENTED BULBUL <i>Iole olivacea</i>		LS	O	C	C P		
YELLOW-BELLIED PRINIA <i>Prinia flaviventris</i>		LS	C	C P	F		
ORIENTAL WHITE-EYE <i>Zosterops palpebrosus</i>		Man	O	O	C P	sec	12 Sept
LAINGOLATED WARBLER <i>Locustella lanceolata</i>			O	O	O	sec/man	14 Sept
RUSTY-RUMPED WARBLER** <i>L. certhiola</i>			O	O	O	man	1986
ORIENTAL RED WARBLER*** <i>Acrocephalus orientalis</i>			O	O	O	sec	28 Sept
DARK-NECKED TAILORBIRD <i>Orthotomus atrogularis</i>		ELS	O	F	O		
RUFIOUS-TAILED TAILORBIRD <i>O. sericeus</i>		Man?	O	F	O		
ASHY TAILORBIRD <i>O. ruficeps</i>		Man?	C	C	O P		
ARCTIC WARBLER <i>Phylloscopus borealis</i>		LS	F	O	F		
WHITE-CHESTED BABBLER <i>Trichastoma rostratum</i>		LS	F	O	F		
FERRUGINOUS BABBLER <i>T. bicolor</i>		XLS	[F] O	[F]	O		
ABBOTT'S BABBLER <i>Malaccocincla abbotti</i>		XLS	O	F	O		
HORSFIELD'S BABBLER <i>M. sepiarum</i>		LS	F	O	F	man	
SHORT-TAILED BABBLER <i>M. malaccensis</i>		LS	C	O	P		
BLACK-CAPPED BABBLER <i>Pellorneum capistratum</i>		LS	O	O	O		
MUSTACHED BABBLER <i>Malacopteron magnirostre</i>		SLS	O	O	P		
SOOTY-CAPPED BABBLER <i>M. affine</i>		ELS	[F] O	[F]	O		
SCALY-CROWNED BABBLER <i>M. cinereum</i>		LS	F	O	O		
RUFIOUS-CROWNED BABBLER <i>M. magnum</i>		LS	F	O	O		
RUFIOUS-BELLIED BABBLER <i>M. abingulata</i>		XLS	O	O	O		
CHESTNUT-BACKED SCIMITAR BABBLER <i>Pomatophilus montanus</i>	GNT	LS	O	O	O		
BORNEAN WREN BABBLER <i>Ptilocichla leucogrammica</i>	GNT	LS	O	O	O		
STRIPED WREN BABBLER <i>Kenopia striata</i>		LS	F	F	F		
RUFIOUS-FRONTED BABBLER <i>Stactytis rufifrons</i>		SLS	F	O	O		

BSpecies

BSpecies	Threat	Habitat	Lower Likau 86 95	Ulu Likau 86 95	Habitat Similajau 86 95	Dates
LACK-THROATED BABBLER <i>S. nigricollis</i>		XLS	O	F	O	1986
CHESTNUT-RUMPED BABBLER <i>S. maculata</i>		LS	F	F	P	1995
CHESTNUT-WINGED BABBLER <i>S. erythroptera</i>		LS	F	F	P	
STRIPED TIT BABBLER <i>Macronus gularis</i>		ELS	C	C	O P	
FLUFFY-BACKED TIT BABBLER <i>M. pitilobus</i>		LS	F	F	O	
BROWN FULVETTA <i>Alcippe brunneicauda</i>		LS	F	F	P	
WHITE-BELLIED YUHINA <i>Yuhina zantholeuca</i>		LS	O	C	P	
YELLOW-BREADED FLOWERPECKER <i>Prionochilus maculatus</i>		LS	F	F	P	
CRIMSON-BREADED FLOWERPECKER <i>P. percussus</i>		LS	O	C	P	
YELLOW-RUMPED FLOWERPECKER <i>P. xanthopygius</i>		LS	F	F	P	
SCARLET-BREADED FLOWERPECKER <i>P. thoracicus</i>		LS	O	F	P	
[BROWN-BACKED FLOWERPECKER <i>Dicaeum everetti</i>]		LS	F	F	O	
YELLOW-VENTED FLOWERPECKER <i>D. chrysorrheum</i>		LS	O	[O]	O	
ORANGE-BELLIED FLOWERPECKER <i>D. trigonostigma</i>		ELS	F	O	O	
PLAIN FLOWERPECKER <i>D. concolor</i>		LS	O	F	O	
SCARLET-BACKED FLOWERPECKER <i>D. cruentatum</i>		LS	F	O	O	
PLAIN SUNBIRD <i>Anthreptes simplex</i>		LS	F	O	O	
BROWN-THROATED SUNBIRD <i>A. malaccensis</i>		LS	F	O	O	
RED-THROATED SUNBIRD <i>A. rhodolaema</i>		LS	F	C	P	
RUBY-CHEEKED SUNBIRD <i>A. singalensis</i>		LS	F	C	P	
PURPLE-NECKED SUNBIRD <i>Hypogramma hypogrammicum</i>		EXLS	O	C	P	
PURPLE-THROATED SUNBIRD <i>Nectarinia sperata</i>		Man?	O	O	O	
COPPER-THROATED SUNBIRD <i>N. calcostetha</i>		Man?	O	O	O	
CRIMSON SUNBIRD <i>Aethiopyga siparaja</i>		Man?	O	O	O	
TERMINICK'S SUNBIRD <i>A. terminickii</i>		XLS	C	C	F	man
LITTLE SPIDERHUNTER <i>Arachnothera longirostra</i>		LS	O	C	C	sec
THICK-BILLED SPIDERHUNTER <i>A. crassirostris</i>		LS	O	C	P	
LONG-BILLED SPIDERHUNTER <i>A. robusta</i>		LS	O	O	F	
SPECTACLED SPIDERHUNTER <i>A. flavigaster</i>		EXLS	? F	? F	? ?	
EURASIAN TREE SPARROW <i>Passer montanus</i>		LS	? F	? F	? ?	
YELLOW WAGTAIL <i>Motacilla flava</i>		LS	O	C	F	sec
GREY WAGTAIL <i>M. cinerea</i>			O	C	F	coas
RED-THROATED PIPT <i>Anthus cervinus</i>			F	F	F	coas/nv
DUSKY MUNIA <i>Lonchura fuscans</i>			C	F	O	coas
WHITE-BELLIED MUNIA <i>L. leucogastra</i>			O	C	F	sec

Ichthyophaga ichhyaetus, Bar-bellied Cuckooshrike *Coracina striata* and two blue flycatcher *Cyornis* species may reflect a genuine scarcity in, or absence from, Similajau N.P. which could not be predicted from the species's ranges.

Only seven (22%) of Wells's (1985) 32 slope specialists were found, reflecting the flat topography and low altitude of Similajau. Surprisingly, two species classified as montane were located, Black Eagle *Ictinaetus malayensis* and Besra *Accipiter virgatus*. However, Black Eagle occurs over a range of altitudes in Borneo, although it is more frequent at higher altitudes (Mann in prep.); the assessment of this species as montane in Borneo was inappropriate. The presence of these slope and montane species is probably related to the proximity of Gunung Dulit (summit 1,400 m); submontane species occur down to sea level in hilly country (Fogden 1976).

Wells (1985) listed a few forest-adapted small-island species: only one was recorded (Grey Imperial Pigeon *Ducula pickeringii*), and it was seen only once.

Many forest species were found only in one year (18 in 1986, 24 in 1995), demonstrating that further species await discovery in Similajau N.P.; at least 60 Bornean lowland forest birds remain unrecorded. Nocturnal birds remain particularly poorly known. Few calling birds were heard during considerable time spent in forest by night in 1995. September may be a poor month for calling by owls, cuckoos, nightjars and frogmouths; few were heard at Barito Ulu (Kalimantan) in September 1989 (Wilkinson *et al.* 1991b). Calling levels of diurnal birds also seemed low in Similajau in 1995 (see Discussion).

Quantitative comparisons between different forest-types in the park cannot be made, as observers moved continuously through a complex mosaic of MDF, *kerangas* and swamp forest, with some parts at the northern end of the park affected by past human interference. Brunig (1974) also found that transitions between these three forest-types were gradual and difficult to define. Furthermore, the habitats are so close to each other that bird mobility would obscure differences in importance to birds.

Mangroves

At least 16, possibly up to 21, bird species in Borneo depend mainly, or wholly, on mangroves (Wells 1985). Similajau supports seven of the 16 (and four of the other five), a high total considering the small area of mangroves. Two species categorized as total specialists (Copper-throated Sunbird *Nectarinia calcostetha* and Mangrove Blue Flycatcher *Cyornis rufigastra*) were found. However, re-examination of records of the flycatcher shows that in Borneo it also occurs in secondary forest, plantations and coastal scrub, and is not a total specialist of mangroves (Mann in prep.). Many species seen in the lower Likau mangroves are not typical of that habitat; the mangroves were of such limited extent that most species of MDF pass through them while moving between different patches of forest.

Scrub and open country

About 35 landbird species found in Similajau N.P. were not classed by Wells (1985) as dependent upon forest or mangroves. All eight species which were markedly more common in 1995 than in 1986, occur commonly in open, scrub, or edge habitats (Table 3), reflecting ongoing forest clearance outside the reserve. Many other such species occur in Bintulu and are likely to colonize the park in the future.

Coast

Thirteen species of waders were recorded in low numbers. The only regular species were Common Sandpiper *Actitis hypoleucos* and (in 1986) Malaysian Plover. The largest flock was of 25 Common Redshanks *Tringa totanus*. The surveys were earlier than the main wader passage; however, relatively few would be expected as the coast is predominantly coarse sand (D. Parish verbally 1986).

Sea

Pelagic seabirds were represented by single Bridled Terns *Sterna anaethetus* offshore on 16 September 1986 and 17 September 1995, and by three single unidentified frigatebirds *Fregata*. Small numbers of terns (particularly, in 1986, Little Terns *Sterna albifrons*) were frequent, and concentrations of feeding terns were present close to the shore on 16 September 1986, 18 and 27 September 1995. On 13 September 1995, 40 terns were found roosting on rocks out to sea in an area not visited subsequently. Some offshore movements of birds were observed: numerous Barn Swallows *Hirundo rustica* (over 100 south per hour on some days), occasional south-bound wader flocks (particularly in late September 1995), and, on 13 August 1986, 40 unidentified terns heading north.

Globally Threatened and Globally Near-threatened species

Twenty species considered by Collar *et al.* (1994) to be either Globally Threatened (Endangered or Vulnerable) or Globally Near-threatened were found in the two years combined, with provisional records of a further one species. All information gathered on these species is presented below. All 1995 records come from forest around the lower Sungei Likau unless otherwise stated. Provisional records are placed in square brackets. FIREBACK sp. *Lophura* Vulnerable (both potential species). A group of at least four Crestless Firebacks *L. erythrophthalma* or Crested Firebacks *L. ignita* was flushed at the margin of mangroves and MDF on 14 September 1995. Single pheasants (Great Argus *Argusianus argus* not excluded) were seen twice on the Batu Ancau trail on 8 September 1995. No pheasants were seen in 1986.

MALAYSIAN HONEYGUIDE *Indicator archipelagicus* Near-threatened. Singles heard at Ulu Likau on 29 August 1986 and 15 September 1995.

RED-CROWNED BARBET *Megalaima rafflesii* Near-threatened. One to three most days in fruiting trees around HQ in September 1995, with birds heard in forest every few days. One heard by the Sungei Similajau on 13 September 1995, but none at Ulu Likau in 1995. In 1986, the species was common at all three sites, with 2-3 dispersed birds frequently audible from a single point; over 20 were estimated around the Sungei Similajau.

The difference in recorded status between the two years probably reflected calling activity, low levels of which in 1995 seemed widespread among forest species.

BLACK HORNBILL *Anthracoceros malayanus* Near-threatened. In 1995 two pairs, sometimes aggregating, were seen regularly around HQ in primary forest and adjacent degraded areas, including around the park HQ. At least one other pair was in the surveyed area of the lower Likau; a flock of at least seven was seen on two days around Ulu Likau and a pair was found at Sungei Similajau.

In 1986, singles were seen around HQ on four occasions; both sexes were present. Up to three were seen about 2 km up the Sungei Likau on three dates and around Ulu Likau on 12 occasions. Groups of three and two were found around Sungei Similajau. These groups temporarily joined at least once, and individuals frequently left for periods of hours; up to two were also found towards the boundary on two dates.

Although adjacent pairs aggregate not infrequently, larger groups, such as that at Ulu Likau in 1995, are more often of subadults (Kemp 1995). The species is an extreme lowland specialist (Wells 1985) with most records from below 200 m (Kemp 1995).

HELMETED HORNBILL *Buceros vigil* Near-threatened. Heard on 8 September 1995 by an observer previously familiar with the species. None was found in 1986. This species's highly distinctive call, audible for up to 2 km, is frequently given by territory holders throughout the day (Kemp 1995), so the species is clearly unusual at Similajau N.P. It occurs primarily in foothills (Kemp 1995).

WRINKLED HORNBILL *Aceros corrugatus* Vulnerable. Groups of up to three in the lower Likau forest on three dates in September 1995 were supplemented by nine flying north on 22 September low over the mangroves. Three were seen daily at Ulu Likau on 13-15 September 1995, but none was recorded at Sungei Similajau.

In 1986, Wrinkled Hornbills were found on a total of 22 days and there were regular pairs around each of the three study sites; the members were often seen separately. The birds around Ulu Likau had tails stained much darker than those at the lower Likau. Three further birds were seen at Ulu

Likau on 25 August. Another pair was seen 700 m upstream along the Sungei Similajau on 15 September 1986.

Thus, records were less frequent in 1995 than in 1986, but groups were larger. Birds range over large areas and may gather in large numbers at suitable fruiting trees (Kemp 1995). The differences in status between the two years are likely to be related to fruiting.

The species prefers lowlands, especially swamp forest near the coast; most records are from below 30 m altitude (Kemp 1995). The frequency of records at Similajau in 1986 compares well with Bornean sites listed by Kemp and Kemp (1975), but density estimation is notoriously difficult (Kemp 1995).

BORNEAN GROUND CUCKOO *Carpococcyx radiatus* Vulnerable. One by the coast path on 22 September 1995. There were no records in 1986 and although this path was traversed frequently in 1995, this was the only record. A bird was collected near Bintulu last century (Sharpe 1877). The species is recorded so infrequently that it is difficult to put this record in context.

BLUE-RUMPED PARROT *Psittinus cyanurus* Near-threatened. A flock of five at Kuala Similajau on 13 September 1995. In 1986 there was a single from the lower Likau, up to 15 on six days at Ulu Likau, flocks of 20 and nine seen along the Likau, and two records (a single and two) at the Sungei Similajau. This considerable decline in records may reflect a real status change; indeed the species was probably under-recorded in 1986, due to prior unfamiliarity with the call.

GREY IMPERIAL PIGEON *Ducula pickeringii* Vulnerable. One on 7 September 1995 roosted in the mangroves with two Green Imperial Pigeons *D. aenea*. It was probably present on 6 September, but from 8 September only two imperial pigeons were in the area. Numbers of this genus were higher in 1986 and this species may have been overlooked. This little-known species, occurring primarily on islands, is widespread in Sabah, but Collar *et al.* (1994) traced no records from Sarawak.

MALAYSIAN PLOVER *Charadrius peronii* Near-threatened. In 1986, single pairs were resident in both Kuala Likau and Kuala Similajau; on 12 September an additional female was at the Similajau. None was found in 1995 despite frequent careful checking of the Likau and Kabalak estuaries and a visit to Kuala Similajau.

Both estuaries formerly occupied are now used heavily by people, the former by park staff and tourists, the latter by loggers and others. This may render the entire park unsuitable for the species, which occurs mainly in muddy areas: birds in 1986 were frequently noted foraging on muddy and rocky substrates, but never on sand. The species is absent from some long stretches of the Sarawak coast which are predominantly sand (Smythies 1981).

JERDON'S BAZA *Aviceda jerdoni* Near-threatened. Singles on 1 September 1986 at Ulu Likau and 17 September 1995 in the Likau mangroves.

DARTER *Anhinga melanogaster* Near-threatened (refers to *A. m. melanogaster* treated as a separate species in Collar *et al.* 1994). Singles along the Likau on four dates in 1986. These sightings probably involved only one bird, making the significance of the probable absence from the Likau in 1995 difficult to assess. It is unlikely to have declined due to park-related disturbance as, for example, in September 1994 a Darter was observed on a pool of diameter 50 m within the Damai Beach resort complex on the Sarawak coast; although the pool was surrounded by natural vegetation and rarely visited by people, construction was occurring within 1.6 km in several directions (R. A. Lewis verbally 1994), and, in Similajau, other large birds (hornbills, owls, etc.) have become confiding around the Likau.

STORM'S STORK *Ciconia stormi* Endangered. One flew south about 200 m above Kuala Likau on 10 August 1986.

BLACK MAGPIE *Platysmurus leucopterus* Near-threatened. Up to three groups, usually of 4-5 birds, on most days in 1995 in MDF and mangroves around the lower Likau. In 1986, up to six birds on eight dates around the lower Likau, two records at Ulu Likau and 1-2 around Sungei Similajau on six dates. Groups were often with Bornean Bristleheads.

BORNEAN BRISTLEHEAD *Pityriasis gymnocephala* Near-threatened. One or two groups (of up to five) were seen in MDF and mangroves around the lower Likau on 11 days in 1995. In 1986, up to five birds were found around the lower Likau on nine days, and up to four were found at Ulu Likau on three days. The species was not recorded around the Sungei Similajau; for such a conspicuous species, this suggests that it was scarce or absent during the survey. It was difficult to establish the number of groups present at a study site; there was little consistency in counts of group size. Because groups foraged with the individuals spaced over a wide area and because non-calling birds were inconspicuous, it was difficult to count groups unless they flew across a river. Variation in group-size counts might also have arisen if several groups lived at each site or if they were of fluid composition.

Individuals were seen frequently within the mid-storey but groups as a whole used mainly the canopy and even emergents. Nash and Nash (1986) noted a preference for the mid/upper canopy. Birds observed twice in secondary growth tended to use tall trees left from the primary forest. Birds were frequently observed foraging in MDF, and, in 1995, in the mangroves (however, a large number of forest species foraged at least briefly in the mangroves). A group observed throughout one day moved through the forest at about 100 m per hour. Birds foraged in a manner similar to the Helmet Vanga *Euryceros prevosti* of Madagascar, with frequent clumsy sally-gleaning (see Evans *et al.* 1992). They also explored foliage in a heavy yet

acrobatic fashion, rather like large tits. Particularly large food items (cicadas, katydids, etc.) were eaten braced against a large branch.

Bristleheads were frequently in mixed-species flocks, as noted by Witt and Sheldon (1994b). In 1986 they were twice seen with Checker-throated Woodpeckers *Picus mentalis*; in 1995 they accompanied Black Magpies many times, as in Sabah (Ahlquist *et al.* 1984), and they were seen once each with Checker-throated and Olive-backed Woodpeckers *Dinopium rafflesii*.

This Bornean endemic is an extreme lowland specialist (Wells 1985) and is rare or uncommon over most of Borneo (Witt and Sheldon 1994b). As such it will always be potentially threatened by habitat loss. The many previous records from coastal areas include Similajau in 1953, but an association with the coast may be an artifact of past collecting and surveying patterns; it seems to be difficult to find the species repeatedly at any given site, suggesting that birds may be present only intermittently (Witt and Sheldon 1994b). The number of records around the Likau in two periods separated by nine years is therefore perhaps surprising as Witt and Sheldon (1994b) considered that, while the bird occurred over a wide range of altitudes and forest-types, it was perhaps mainly found in tall forests on good soil. Further survey around Sungei Similajau, to assess whether the lack of records there reflects a real absence, is desirable before concluding that the poorer soils of this part of the park are responsible for the lack of Bristleheads.

HOOK-BILLED BULBUL *Setornis criniger* Near-threatened. In 1995, one in MDF around the lower Likau on 11 September and at least three (in ones and twos) on both 13 and 14 September at Sungei Similajau. In 1986, 1-2 were seen thrice around the lower Likau and twice at Ulu Likau. Birds were seen on seven days around the Sungei Similajau, in groups of 1-2, with a peak daily count of seven (and four were netted there).

One on 7 August 1986 was carrying food. One on 14 September 1995 displayed to another by lowering its head and shivering its outstretched wings.

The species is distributed patchily in Borneo, primarily in areas of nutrient-deficient soil and there are previous records from Similajau and Bintulu (Sheldon 1987). In both 1986 and 1995, it was clearly more common around Sungei Similajau than around Sungei Likau, and this may reflect the greater area of *kerangas*-type forest around the former.

WHITE-CHESTED BABBLER *Trichastoma rostratum* Near-threatened. One on 11 September and two on 19 September 1995 around the lower Likau. In 1986, four singles around the lower Likau and two records of 1-2 at Ulu Likau were probably this species.

FERRUGINOUS BABBLER *Trichastoma bicolor* Near-threatened. In 1986, two were netted in secondary forest near HQ, 1-2 were seen five times at Ulu Likau (with two netted there) and one was seen at Sungei Similajau. None

was recorded in 1995. There is no obvious reason why the species would decline in Similajau between 1986 and 1995, and this pattern of records may have arisen by chance.

GREY-BREASTED BABBLER *Malacopteron albogulare* Near-threatened. In 1995, 1-2 were recorded on three dates around the lower Likau. In 1986, a single was seen by Sungei Similajau, a group of four around the lower Likau (with one netted there) and two were netted at Ulu Likau.

Birds were not found in mixed-species flocks, a difference from many other babblers also noted by Holmes and Wall (1989) and Dutson *et al.* (1991). All birds were in the understorey or lower mid-storey, as noted by Dutson *et al.* (1991).

This species, as Hook-billed Bulbul, occurs mainly in forest over soils low in nutrients and there are previous records from Similajau and Bintulu (Sheldon 1987). Dutson *et al.* (1991) stated that the species was common in secondary forest in Similajau, but this was a misinterpretation of information received.

BORNEAN WREN BABBLER *Ptilocichla leucogrammica* Near-threatened. Singles in the lower Likau forest on 17 August 1986 and 19 September 1995 (heard only) and around Sungei Similajau on 13 September 1986. It was surprising that this species was not seen in 1995, as, with the creation of paths through the forest, other terrestrial birds were much easier to detect.

[BROWN-BACKED FLOWERPECKER *Dicaeum everetti*] Near-threatened. Singles (provisionally identified) on 19 and 24 August 1986 at Ulu Likau and on 28 September 1995 around the HQ. On all occasions the thick bill was seen but the sightings were too brief for confirmed records.

Other species of interest

This section details all species which underwent a marked change in recorded status, which includes:

1. species recorded in only one year, with four or more records (excluding species where it is likely that fewer than four individuals or flocks were involved);
2. species recorded in both years which changed from Common to Occasional or vice-versa;
3. commonly recorded species showing changed numbers recorded per day, or a change in the location of records.

Hornbill records are discussed for all species because, elsewhere in South-East Asia, as a group they seem more sensitive to human pressure than are other large birds (Round 1984, Thewlis *et al.* in prep.). Further species are included which were unexpected based upon published information, primarily Smythies (1981).

All 1995 records come from forest around the lower Sungei Likau unless otherwise stated. Provisional records are placed in square brackets.

GREAT ARGUS *Argusianus argus* One or two were heard on several dates around the lower Likau in 1995. In 1986, none was heard around the lower Likau, but 4-5 were present at Ulu Likau (and a display ground was found) and birds were heard on three dates around Sungei Similajau.

Smythies (1981), writing in the 1960s, noted that Great Argus was decreasing in Borneo and Nash and Nash (1986) presented circumstantial evidence that the bird had been trapped out from Tanjung Puting, Kalimantan. However, at least in some areas of Sarawak, it seems very resilient to human pressure (E. L. Bennett verbally 1995), as it is in Brunei (Mann in prep.).

BUFF-RUMPED WOODPECKER *Meiglyptes tristis* Up to four birds on six days in 1995 in mangroves and MDF around the lower Likau; two at Ulu Likau on 15 September 1995. Unrecorded in 1986.

GREY-AND-BUFF WOODPECKER *Hemicircus concretus* Recorded twice each at Ulu Likau (groups of four) and Sungei Similajau (groups of two) in 1986, but unrecorded in 1995.

RED-THROATED BARBET *Megalaima mystacophanos* Four records of 1-2 around the lower Likau and one from Ulu Likau in 1986, but unrecorded in 1995.

ORIENTAL PIED HORNBILL *Anthracoceros albirostris* Two at the mouth of the Sungei Similajau on 13 September 1995, where in September 1986 a party of four was resident. Also in 1986, three singles in coastal vegetation around the HQ and one by the coast 1 km south of the Sungei Similajau.

This is the rarest hornbill in Borneo, occurring mainly in coastal areas (Kemp and Kemp 1975), but it is of low global conservation concern as it persists well in cleared areas and has a wide world range. Pairs or groups of 4-6 are usual (Kemp 1995); the difference in numbers at the Sungei Similajau between the two years is most likely to be due to breeding cycle differences.

RHINOCEROS HORNBILL *Buceros rhinoceros* Groups of two, probably the same, around the lower Likau on 10 September and at Ulu Likau on 14 September 1995. One around the lower Likau on 10 August 1986 and five records at Ulu Likau in that year, usually of single birds but once two were suspected.

The species has distinctive calls and so was probably uncommon in the surveyed areas; it is usually common, widespread and frequently heard in suitable habitat (Kemp 1995). Although numbers may fluctuate, most birds live as resident territorial pairs and call throughout the day (Kemp 1995).

BUSHY-CRESTED HORNBILL *Anorrhinus galeritus* Up to three around the lower Likau on six dates in 1995; possibly all records refer to one party. In 1986, a group of 4-5 birds roamed from 1 km south of the HQ to at least 600 m north of the Viewpoint on four dates; two were found thrice in fruit trees at

Ulu Likau; and a group of four was seen at Sungei Similajau on 13 September.

Kemp and Kemp (1975) recorded this species once every 8.6 hours in their poorest study site in Sarawak; this is much more frequently than at Similajau. Furthermore, the species usually lives in groups of 8-10, with five being the lowest mentioned by Kemp and Kemp (1975). It therefore appears that Similajau provides sub-optimal conditions for the species.

WHITE-CROWNED HORNBILL *Aceros comatus* Two over the Likau 3.5 km upstream of the HQ on 29 August 1986; there were no records in 1995. This slope specialist (Wells 1985) usually occurs in groups of 4-5 (Leighton 1982) and the calls were known to some observers. Thus, even though it is easily overlooked if not calling (Kemp 1995), it is probably not common in Similajau. Harrisson (1966) recorded a flock near the Bintulu hills.

RED-NAPED TROGON *Harpactes kasumba* At least one seen regularly in 1995 around the lower Likau, with two other groups of two on 10 September 1995. In 1986, the species was unrecorded, although a male of this species or Diard's was seen near Sungei Similajau on 13 September.

DIARD'S TROGON *Harpactes diardii* Singles or pairs around the lower Likau on four dates in September 1995. A male was seen at Ulu Likau on 13 September 1995. The lack of records in 1986 is not easily explicable

[CINNAMON-RUMPED TROGON *Harpactes orrhophaeus*] Sightings of one on 23 August 1986 and 1-2 on three days in 1995 involved no adult males and the records are treated as provisional because of the difficulties of excluding Scarlet-rumped Trogons with brown rumps.

Smythies (1981) assessed the species as a submontane, occurring at 1,000-1,500 m; Wells (1985) however categorized the species as a lowland slope specialist and MacKinnon and Phillipps (1993) noted occasional lowland records. See also Mann (1988, 1991, in prep.).

BLUE-BANDED KINGFISHER *Alcedo euryzona* Singles or pairs on four dates in September 1995 on the lower Likau or on forest streams. A male at Ulu Likau on 14 September 1995. The lack of records in 1986 is not easily explicable.

ORIENTAL DWARF KINGFISHER *Ceyx erithacus* Up to three at all three study sites in 1986, although in 1995 none was recorded from Ulu Likau or Sungei Similajau. Birds were closest in plumage to the rufous-backed form ('*rufidorsus*') and could be taken as such in the field, but most of the 11 caught in 1986 showed some characters of black-backed ('*erithacus*'); some had extensive dark feathering on the back. Birds in Borneo often show mixed characters (Ripley and Beehler 1987).

[HORSEFIELD'S BRONZE CUCKOO *Chrysococcyx basalís*] One in trees around HQ on 19 September 1995 was identified provisionally by its head pattern and call of descending whistles. It appeared to have a dark forehead and a pronounced supercilium which curved round the rear border of the ear coverts.

SWIFTLET SP. *Collocalia* On most evenings in 1995, up to 20 (once 30, frequently only six or so) swiftlets fed around Kuala Likau. The only higher count was of about 50 feeding over the HQ and adjacent degraded forest one showery morning. Up to 20 were seen at Ulu Likau and 10 at Sungei Similajau. However, in 1986, up to 20 were at Ulu Likau, up to 50 at Kuala Similajau, and up to 200 fed low over Kuala Likau every evening. A major decline has probably occurred in the numbers congregating to feed over these two rivers.

SILVER-RUMPED NEEDLETAIL *Rhaphidura leucopygialis* On most evenings in 1995, fewer than a dozen birds fed over Kuala Likau. Larger numbers (up to 30, once 50) fed over the forest and HQ by day. Up to ten were seen at Ulu Likau. In 1986, 5-10 were seen in the evenings at Ulu Likau and Kuala Similajau, with 35-50 feeding over Kuala Likau most evenings. As with swiftlets, evening numbers at this latter site have plummeted.

GREY-RUMPED TREESWIFT *Hemiprocne longipennis* On most days in 1995, 15-30 Grey-rumped Treeswifts fed around the area cleared for the HQ; odd birds were noted on most days over the forest and the estuary of the Likau. One was seen at Ulu Likau on 14 September 1995. In 1986, records showed a different pattern: most birds around the lower Likau (up to 14, usually 6-10) were seen with the evening flocks of swiftlets over the estuary, with only small numbers seen by day. At Ulu Likau, 2-6 were seen most days, and up to 70 were seen beside the Sungei Similajau; these latter were beside another artificially cleared area (for the purposes of logging).

WHISKERED TREESWIFT *Hemiprocne comata* About five birds seemed to be resident in the cleared area around the HQ in 1995. In 1986, none was recorded around the HQ but 2-3 pairs were seen along the Likau, the Similajau and at Ulu Likau.

BROWN WOOD OWL *Strix leptogrammica* In 1995, up to three in the artificially lit areas around the HQ on most nights could be approached within 6 m and illuminated with a powerful (about 500,000 cp) spotlight without flying off. One was flushed from its daytime roost in coastal forest on 10 September 1995. In 1986, groups of two were seen roosting by day at both coastal sites and one was heard at Ulu Likau on 22 August 1986.

GREEN IMPERIAL PIGEON *Ducula aenea* Up to two on most days in 1995 around the estuary and mangroves of the Sungei Likau. Fifteen by the lower Sungei Similajau on 14 September 1995 after two the previous day. By contrast in 1986, there was one record from Ulu Likau, up to eight birds almost daily around the lower Likau, and up to 36 roosting in riverside trees by the Sungei Similajau.

It is not possible to decide whether the reduction in the number of records between the two years indicates a population decline, but Green Imperial Pigeon has declined greatly in Laos (Thewlis *et al.* in prep.) and Thailand (Boonsong and Round 1991).

GREY-TAILED TATTLER *Heteroscelus brevipes* Up to four on four dates from 17 September 1995 at the Viewpoint and at Kuala Kabalak.

[GREAT CRESTED TERN *Sterna bergii*] Seen on four days in 1995, maximum about 20 on 27 September. About 80 of this species or Lesser Crested on 16 September 1986 (all identifications provisional).

LITTLE TERN *Sterna albifrons* No terns of any species were observed in 1995 resting or feeding within the estuaries of the park, although up to seven Little Terns were seen foraging and resting in Kuala Likau and up to 13 in Kuala Similajau (with up to three recently-fledged juveniles) in 1986. Little Terns persisted in the area, however, in 1995: four were seen from HQ on 22 September 1995, at least 40 small terns probably of this species were found perched on rocks out to sea on 13 September and nine, probably of this species, were seen fishing off Kuala Likau on 14 September.

The species was described as occasional in Borneo by Smythies (1981). The first confirmed breeding for Borneo was reported by Mann (1989), from Brunei. Juveniles were flying in early September, a timing similar to that in Similajau in 1986.

BESRA *Accipiter virgatus* One hunting from posts around the HQ on 27 September 1995 was viewed down to 30 feet by an observer familiar with the species; the bold mesial streak and barred lower breast and belly were seen clearly. This is a surprising record as the species is regarded as montane in Borneo (Francis 1984, Wells 1985), with a lower limit of 300 m (Smythies 1981). There was only one other, unidentified, accipiter seen during 1995.

BLACK EAGLE *Ictinaetus malayensis* Single adults on 25 August 1986 (Ulu Likau) and 14 September 1995 (Sungei Similajau). Although categorized by Wells (1985) as a montane species in Borneo, Harrisson (1963) and Smythies (1981) recorded it down to sea level.

RUFOUS-BELLIED EAGLE *Hieraetus kienerii* Single adults on 25 August 1986 (Ulu Likau) and 20 September 1995 (near the HQ). Smythies (1981) considered this to be 'a rare bird of uncertain status' in Borneo.

BLACK-THIGHED FALCONET *Microhierax fringillarius* Up to four were seen daily around the HQ in 1995. In 1986, the sole record was of a pair in MDF near the HQ on 3 September. The species probably benefited locally from the extensive forest clearance, although birds in primary forest are easily overlooked as they perch mainly in emergent trees.

LITTLE HERON *Butorides striatus* Up to three on nine dates on and after 15 September 1995 at and around Kuala Likau. None was seen in the 11 days in 1995 prior to 15 September or in 1986, when observations ceased on 16 September. Most sightings were towards dusk.

The relative status of migrant and resident birds in Borneo is poorly known (Smythies 1981). The dates of birds in Similajau N.P. strongly suggest that they were migrants. Although in Thailand, estuarine mangroves

are typically used by resident birds, with migrants occurring on forest streams (Boonsong and Round 1991), mangroves in Borneo appear to support both classes of birds (Mann in prep.).

CROW-BILLED DRONGO *Dicrurus annectans* One or two on eight days from 9 September 1995 onwards. The lack of records in 1986 may reflect the earlier cessation of observations in that year.

ASIAN PARADISE-FLYCATCHER *Terpsiphone paradisi* In 1986 single birds were recorded twice each at Ulu Likau, the lower Likau and Sungei Similajau, but the species was not found in 1995.

GREY-STREAKED FLYCATCHER *Muscicapa griseisticta* A bird at the lower Likau on 10 and 12 September 1995 was identified as this species rather than Asian Brown *M. dauurica* or Dark-sided Flycatchers *M. sibirica* by the following features, which were checked against museum skins and with Alström and Hirschfeld (1989): the noticeable braided streaks down the flanks; the upperparts the same tint of grey-brown as Asian Brown in the same season; the beak shorter than Asian Brown but longer than Dark-sided, with limited pale at the base of the lower mandible. The observer saw many of the two confusion species in Laos in the preceding spring, and saw several Asian Brown Flycatchers in Similajau (from 18 September) and in Thailand afterwards. Brown-streaked Flycatcher *M. williamsoni* was eliminated by upperpart colour: all skins at BM(NH) were markedly warmer brown above than were Asian Brown or Grey-sided Flycatcher.

Smythies (1981) listed only three Bornean records, all from Sabah.

SIBERIAN BLUE ROBIN *Luscinia cyane* Seven singles by the coast path on 27 September 1995 represent a remarkably concentrated arrival for a non-flocking species, but, given the effort searching for ground birds, it is unlikely that significant numbers were present on previous days.

ORIENTAL MAGPIE ROBIN *Copsychus saularis* At least 20 birds were defending territories in and around the cleared areas of the HQ in 1995. In 1986, the sole record was of a single in secondary growth near the HQ on 6 August.

WHITE-RUMPED SHAMA *Copsychus malabaricus* Shamas were common in both years, with several trapped in 1986. All were this species, rather than the northern White-crowned Shama *C. stricklandii*, which Hose (1893) recorded south to Bintulu. Smythies (1981) did not record *C. stricklandii* from so far south.

ASIAN GLOSSY STARLING *Aplonis panayensis* A flock of 30-40 daily in fruiting trees around HQ during 4-11 September 1995, with smaller numbers on five subsequent days and 19 on 28 September. The lack of records in 1986, when trees were in fruit in this same area, perhaps relates to the presence of thick surrounding forest then.

BLACK-AND-WHITE BULBUL *Pycnonotus melanoleucos* Singles on 10 and 12 September 1995 contrasted with six records of 2-3 around the lower Likau,

daily records of 1-3 at Ulu Likau from 22 August onwards, and up to three at Sungei Similajau on five dates in 1986. The difference in records is probably due to short-term nomadic behaviour: in 1986 the species was unrecorded prior to 20 August, but from then was recorded almost daily. GREY-BELLIED BULBUL *Pycnonotus cyaniventris* Small numbers (1-4) at Ulu Likau on six dates and at the lower Likau on two dates in 1986, but unrecorded in 1995.

YELLOW-VENTED BULBUL *Pycnonotus goiavier* At least four (usually in twos) around the park HQ throughout September 1995, but unrecorded in 1986.

YELLOW-BELLIED PRINIA *Prinia flaviventris* Up to two birds daily around HQ in 1995; in 1986 there was only one record there. Birds were found easily in scrub around Sungei Similajau in both years.

ORIENTAL WHITE-EYE *Zosterops palpebrosus* Up to fifty on many mornings in 1995, dispersing from a presumed roost in or near the mangroves. Very close views on several dates around the HQ allowed confident elimination of Everett's White-eye *Z. everetti*. Apart from one flock (of 4-5) in coastal forest, white-eyes were not recorded in forest canopy in 1995, but in 1986 the only records were of 1-4 (not identified to species) seen five times within MDF.

Smythies (1981) lists the species from few localities in Borneo, all well south of Similajau, but Mann (in prep.) included Brunei in the species's range.

LANCEOLATED WARBLER *Locustella lanceolata* One on 12 September 1995 in the mangroves. Smythies (1981) listed only a few records from Borneo; Mann (in prep.) added only one record.

ABBOTT'S BABBLER *Malacocincla abbotti* Up to three birds on five dates in 1995 in the mangroves and nypah around the lower Likau. All records probably involved the same party. In 1986, two records of 1-2 in similar habitat around Sungei Similajau were provisionally identified as this species.

Abbott's Babbler is atypically scarce on Borneo. Most of the few records traced by Witt and Sheldon (1994a) were in scrub at low altitudes, particularly near the coast and in association with nypah and mangroves. The records from Similajau are thus in typical habitat.

RUFIOUS-FRONTED BABBLER *Stachyris rufifrons* Two at Ulu Likau on 14 September 1995 and one in a mixed-species flock in forest around the lower Likau on 23 September. Five records of 1-3 in 1986 around the lower Likau. Regular occurrence is perhaps surprising as Smythies (1981) described the bird as a rare submontane species; Wells (1985), however, listed it as a lowland slope specialist.

STRIPED TIT BABBLER *Macronous gularis* Up to three around the HQ and in forest daily in 1995, with calls believed to be from this species heard on many other days. In 1986 the species was recorded only around the Sungei Similajau, where it was seen twice. The change in number of records may be entirely due to observer ability.

CRIMSON-BREASTED FLOWERPECKER *Prionochilus percussus* Two males on three days in 1995 around the lower Likau, with several more records of birds of either this species or Yellow-rumped Flowerpecker *P. xanthopygius*. Two singles around the lower Likau and five singles at Ulu Likau in 1986. Most prior records from Borneo come from the south, with the closest coming from Kuching (Smythies 1981); however, the species occurs in Brunei (Mann in prep.) so it is not surprising to find the bird regularly in Similajau.

EURASIAN TREE SPARROW *Passer montanus* Large numbers (at least 50) were found around the HQ throughout September 1995. In 1986, there were four records of small numbers, most staying only briefly, although one remained for two days.

DISCUSSION

Differences between the two years

Differences in birds recorded between the two years are presented together with possible explanations of these differences in Table 3. Birds may have appeared to change status for four reasons:

1. A genuine long-term change in occurrence;
2. Seasonal or other cyclical patterns;
3. Natural year-to-year variation;
4. Sampling effects.

The first possibility is of most practical concern to conservation. In order to identify conservation gains and losses between the two years, it is therefore necessary to tease out its effects from factors 2-4.

The 1995 visit was timed to coincide with the 1986 survey, to minimize seasonal changes. Nonetheless, some were apparent, and not only because the two visit periods were not entirely congruent. Observations ran during 6 August - 16 September 1986 and during 4-28 September 1995. The prolongation in 1995 doubtless explains why more Palearctic migrants were recorded in 1995 than in 1986 (25 species compared with 17). As, even in 1995, observations finished while migration was just underway, no significance can be attached to migrants recorded in one year but not the other.

Irregular, sometimes long-distance, movements are undertaken, particularly by frugivores (Wells 1985). Timing can vary between years depending on fruiting patterns. Many surveys would be required to demonstrate that frugivorous species had changed in overall status.

Birds show seasonal variations in detectability based upon their calling frequency. Vocal activity appeared to be much lower in 1995 than in 1986. Visual finding rates of birds such as Red-crowned and Blue-eared Barbets

Table 3. Bird species recorded at Similajau N.P. in only 1986 or only 1995, or showing a change in status between the two years.

Species	Changes confounding results					Real changes			
	few records	low calls	mainly UL/SS	migrant/nomad	identification difficulties	forest floor	open / secondary species	river quality	human disturbance
Species recorded in 1985 but not in 1986									
Fireback sp.	X					X			
Buff-rumped Woodpecker									
Helmeted Hornbill	X			Xn					
Red-naped Trogon									
Diard's Trogon									
Blue-banded Kingfisher								X	
Chestnut-winged Cuckoo	X			Xm					
Banded Bay Cuckoo	X	X			X		X		
Plaintive Cuckoo	X				X		X		
[Horsfield's Bronze Cuckoo]	X			Xm/n			X?		
Bornean Ground Cuckoo	X				X				
Frogmouth sp.	X	X			X				
Little Green Pigeon	X			Xn	X				
Grey Imperial Pigeon	X			Xn	X				
Grey-tailed Tattler				Xm					
Ruddy Turnstone	X			Xm					
Red-necked Phalarope	X			Xm					
[Lesser Crested Tern]	X			Xm	X				
[Great Crested Tern]				Xm	X				
Osprey	X			Xm					
Besra	X				X				
Little Egret	X			Xm			X		
Intermediate Egret	X			Xm			X		
Chinese Pond Heron	X			Xm			X		
Little Heron				Xm?					
Garnet Pitta	X					X		X	
Black-and-red Broadbill	X								
Tiger Shrike	X			Xm			X		
Brown Shrike	X			Xm			X		
Mangrove Whistler	X								
Lesser Cuckooshrike	X								
Crow-billed Drongo				Xm	X				
Large Woodshrike	X								
Grey-streaked Flycatcher	X			Xm	X				
Mugimaki Flycatcher	X			Xm					
Siberian Blue Robin				Xm		X			

Species	Changes confounding results					Real changes			
	few records	low calls	mainly UL/SS	migrant/nomad	identification difficulties	forest floor	open / secondary species	river quality	human disturbance
Asian Glossy Starling				Xn					
Yellow-vented Bulbul								X	
Buff-vented Bulbul	X			Xn				X	
Lanceolated Warbler	X			Xm				X	
Oriental Reed Warbler	X			Xm				X	
Black-capped Babbler	X							X	
Yellow-vented Flowerpecker	X				X	X		X	
Spectacled Spiderhunter	X				X				
Yellow-eared Spiderhunter	X				X				
Species recorded more frequently in 1995 than in 1986									
Grey-rumped Treeswift								X	
Whiskered Treeswift								X	
Black-thighed Falconet								X	
Oriental Magpie Robin								X	
Yellow-bellied Prinia								X	
Oriental White-eye								X	
Striped Tit Babbler					X			X	
Eurasian Tree Sparrow							X		
Species recorded more frequently in 1986 than in 1995									
Red-crowned Barbet		X							
Blue-rumped Parrot			(X)						
Swiftlet sp.								X	
Silver-rumped Needletail								X	
Green Imperial Pigeon			(X)						
Little Tern									X?
Black-and-white Bulbul				Xn					X
Species recorded in 1986 but not in 1995									
Grey-and-buff Woodpecker			X						
Great Slaty Woodpecker	X								
Red-throated Barbet									
White-crowned Hornbill	X			Xn					
Banded Kingfisher	X	X	X						

Species	Changes confounding results					Real changes			
	few records	low calls	mainly UL/SS	migrant/nomad	identification difficulties	forest floor	open / secondary species	river quality	human disturbance
Blue-throated Bee-eater	X			Xm			X		
Oriental Bay Owl	X	X							
Large-tailed Nightjar	X	X	X						
Terek Sandpiper	X		X	Xm					
Sanderling	X			Xm					
Red-necked Stint	X		X	Xm					
Little Ringed Plover	X		X	Xm					
Malaysian Plover									X
Bat Hawk	X								
Changeable Hawk Eagle	X		X		X				
Darter	X		X					X	
Storm's Stork	X							X	X
Dusky Broadbill	X		X						
Golden-bellied Gerygone	X	X							
Dark-throated Oriole	X		(X)	Xn					
Asian Paradise-flycatcher									
Maroon-breasted Philentoma	X		X						
Grey-bellied Bulbul			(X)	Xn					
Finsch's Bulbul			X	Xn					
Ferruginous Babbler			(X)						
Scarlet-backed Flowerpecker	X				X		X		
Temminck's Sunbird	X								
Red-throated Pipit	X			Xm			X		

Changes:	
few records:	X = the species was recorded fewer than four times.
low calls:	X = calls were heard surprisingly infrequently in 1995, or not at all.
mainly UL/SS:	X = species was recorded at only Ulu Likau or Sungei Similajau; (X) = species was recorded mainly at one or both of these two sites.
migrant/nomad:	Xm = a regular long-distance migrant; Xn = a nomad or irregular short-distance migrant.
identification difficulties:	X = significant numbers of the species may have been overlooked due to identification difficulties.
forest floor:	X = species occurs mainly on the forest floor.
open / secondary species:	X = species occurs mainly in open areas or in secondary growth.
river quality:	X = species feeds in or over rivers and may have been affected by changes in their water quality
human disturbance:	X = species may have been affected by changing levels of human activity in and around the park.

Megalaima australis, Green Broadbill *Calyptomena viridis*, *Eurylaimus* broadbills and Malaysian Eared Nightjar *Eurostopodus temminckii* were similar in the two years, yet all were heard much less frequently in 1995 than in 1986. In 1995, calls were also heard surprisingly infrequently (or not at all) for green pigeons *Treron*, Oriental Bay Owl *Phodilus badius*, nightjars *Caprimulgus*, Banded Kingfisher *Lacedo pulchella*, Moustached *Malacopteron magnirostre* and Sooty-capped Babblers *M. affine*, Golden-bellied Gerygone *Gerygone sulphurea* and Mangrove Whistler *Pachycephala grisola*. At Semongoh, Kuching, high levels of singing were found in late September and October after a summer lull (Fogden 1972) and it may be that in 1995 the cycle of most birds was somewhat retarded.

Random effects on birds recorded, both natural and artificial, cannot be eliminated from any survey. For this analysis, species recorded fewer than four times in one year and not at all in the other were taken to be recorded too infrequently for status trends to be assessed. This threshold is probably too low, as some species recorded in only one year for which it is difficult to suggest plausible reasons for increase or decrease in populations (e.g. Asian Paradise-flycatcher, Buff-rumped Woodpecker) were recorded four or more times in the other.

Aside from low total number of records, the various factors discussed below (some due to chance, some reflecting real changes) may contribute to differences in the results of the two years.

Changes confounding the results

The observers in 1986 lacked prior experience of tropical forest birding and of the South-East Asian avifauna, but the observers in 1995 had between them amassed several years surveying birds in South-East Asia. Thus, detection and identification skills were much higher in 1995 than in 1986. This has been regarded as an important factor in Table 3 where a species difficult to identify may have been missed among another species, one difficult to find may have been overlooked, or where it is difficult to get views clear enough for identification of the birds, such as flowerpeckers flying overhead.

In 1986 there were no existing paths around the lower Likau or the Similajau; at Ulu Likau there was the boundary trail. In 1995 there was an excellent path network around the lower Likau, including a boardwalk of several hundred metres through the mangroves (a habitat particularly difficult to survey in 1986). There were also some good paths at Ulu Likau. Observers therefore spent much more time looking for and at wildlife in 1995 than in 1986, when the physical needs of negotiating through the forest detracted severely from birding opportunity, and the noise of doing so probably flushed shy species. This effect was particularly prominent for forest floor birds (Table 4), both in terms of the range of species detected

	Records 1986	Records 1995
Crested Partridge	6	1
Partridge sp.	2	0
Pheasant sp.	0	3
Bornean Ground Cuckoo	0	1
Garnet Pitta	0	2
Rufous-tailed Shama	2	3
Black-capped Babbler	0	3
Bornean Wren Babbler	2	0
Striped Wren Babbler	5	9
Total species	5	7
Total contacts	17	29

The number of records represents the number of visual contacts; flocks constitute one record.

Emerald Dove was also recorded in both years, but mostly in flight. Great Argus was heard but never seen, in both years. Siberian Blue Robin is excluded as it is unlikely that significant numbers arrived during the 1986 survey.

Table 4 Records of ground-living birds in Similajau N.P.

and their frequency of sightings.

Coverage of Ulu Likau and Sungei Similajau was poorer in 1995 than in 1986, but effort was higher around the lower Likau in 1995 (Table 1). Thus, patchily distributed species were less likely to be found in 1995 than in 1986. Nonetheless, the number of species found around the lower Likau in 1995 which in 1986 were found only around Ulu Likau or Sungei Similajau (Table 3) suggests that patchy distribution across the park is of less importance than was suggested by Duckworth and Kelsh (1988).

Real changes likely to be reflected in the results

In 1986, Similajau Forest Reserve was a large (1,203 km²) area of lowland evergreen forest completely surrounding the landward margins of the national park. By 1995 it had been almost completely felled for timber and is scheduled to be replaced by oil-palm plantations (S. Aban verbally 1995). Forest birds from the felled areas are likely to have dispersed into adjacent remaining forest (including Similajau N.P.) in the short term (although population densities in remaining forest are unlikely to change much in the long term) and thus more birds of more species would be expected in 1995. Similajau is now less well connected to other forest areas and a gradual loss of species (particularly those at low densities) is likely for birds unwilling to disperse across plantations, scrub and open areas. This is unlikely to have had a major influence on the park's birds by 1995, but the number of submontane species in the park might show long-term decline as forest is no longer continuous with Mount Dulit.

Open-country species are likely to increase. Clearance south of the Likau (and outside the park boundaries) for the park HQ has already benefited

numerous scrub species (Table 3). In fact, this is likely to be the major explanation for 10 of the 19 species showing an increase in records between the two years; all 10 are widespread and thriving and increases in them are not gains for conservation.

Hunting in the park was rife in 1986, but it was not shown to be affecting any bird species. Although Aken (1982) suspected that hunting was the main reason for the low numbers of hornbills recorded at Similajau N.P., densities in 1986 were lower than in some other areas of Sarawak with much higher levels of hunting (M. J. Lewis verbally 1986). On the basis of group size and distribution of records in 1986, A. C. Kemp (*in litt.* 1987) suspected that poor habitat was the main cause of the low numbers. This suspicion is strengthened by the observations in 1995, which showed that hornbills were similar in status to 1986; by contrast, records of quarry species of mammals were much more frequent in 1995 (Duckworth *in prep.*). With the implementation of management and tourism, hunting has effectively ceased in the lower Likau area. The behaviour in 1995 of primates, a popular target for hunters, suggested that hunting was infrequent (if it occurred at all) around Sungei Similajau and at Ulu Likau (Duckworth *in prep.*).

In contrast to hunting, incidental human pressure has increased. Many tourists visit the park at weekends. Over festivals, hundreds may be around the lower Likau. These people might disturb wildlife, but most enter the forest only briefly if at all, preferring the beaches. No forest degradation appears to have resulted from tourists. At the northern end of the park, the Sungei Similajau is used for transporting logs, and boat traffic on the river is heavy. Many people live on the north bank of the river near its mouth (outside the park), but they seem to enter the park's forest infrequently. It is therefore unlikely that human pressure is having a major effect on forest birds. However, the loss of Malaysian Plover and the change in behaviour of Little Terns probably stem directly from the heavy use made of the mouths of the two main rivers. The latter species is notoriously sensitive to human pressure in at least some other parts of its range (e.g. Lloyd *et al.* 1991).

Water quality changed dramatically in the Likau and Similajau between the two years. In 1986 these were both clear-water rivers, turbid only after heavy rainstorms and regaining their clarity within a day or so. In 1995, after felling in the Similajau Forest Reserve, the rivers were permanently muddied with heavy loads of sediment. The increase of sediment in streams in a logged area in Sabah were discussed by Douglas *et al.* (1992). The decline in swiftlets and Silver-rumped Needletails between the two years might relate to the changed water quality and the Darter might also find the area less attractive with turbid rivers: the species was found to be restricted to areas of clear water in Cambodia (Mundkur *et al.* 1995).

Changes in the community

Changes in the perceived bird community are shown in Table 3, with possible contributory factors.

All eight species recorded in both years which were recorded markedly more often in 1995 than in 1986 occur in scrub, edge or open areas. Except perhaps for Striped Tit Babbler, these are likely to be real increases reflecting the extensive clearance around the park, including that for the park HQ and accommodation.

Seven species found in both years were recorded less frequently in 1995 than in 1986. This includes two swift species that may be affected by changes in water quality. Little Tern appears to have ceased breeding in response to disturbance and to have changed its feeding sites with a reduction in water quality. There is no obvious explanation for the decline in Blue-rumped Parrots, but one of such a magnitude in such a conspicuous species is unlikely to be an artefact. Two other species may be nomadic and Red-crowned Barbet seemed to be calling much less frequently in 1995 than in 1986.

Twenty-eight species were recorded in 1986 but not in 1995. Only seven of these (all resident) were found at least four times in 1986. Four were mainly or solely seen at Ulu Likau and Sungei Similajau, areas which were poorly surveyed in 1995. There is no clear explanation for Asian Paradise-flycatcher and Red-throated Barbet, so perhaps these are sampling errors, despite the fact that both were recorded six times in 1986. Malaysian Plover is probably a genuine loss due to disturbance.

Even among the species recorded fewer than four times in 1986, for many species a clear factor can be identified which may have reduced the chances of detection in 1995: 13 species were recorded mainly at Ulu Likau and/or Sungei Similajau; six are migrants; four are primarily detected by voice (and calling levels seemed lower in 1995 than in 1986); while Great Slaty Woodpecker *Mulleripicus pulverulentus* and Temminck's Sunbird *Aethopyga temminckii* were both recorded only once each.

Among these 28 species, only three are open-country or scrub birds, and none is a forest-floor bird.

Forty-five species were recorded in 1995 but not in 1986. Only 11 of these 45 were found four or more times (a remarkably similar proportion to that shown by 'lost' species). Of these 11, only two (surprisingly) are open-country species; four or five are migrants; and two may have been overlooked in 1986 through identification difficulties. Four are resident forest birds: Buff-rumped Woodpecker, Blue-banded Kingfisher, Red-naped and Diard's Trogons, recorded seven, five, seven and five times respectively. Three of the four were recorded at both Likau sites, suggesting that they have healthy populations. Although these birds may have been displaced by the felling of the Similajau Forest Reserve, they may merely represent chance vagaries of

recording, just as Asian Paradise-flycatcher and Red-throated Barbet were recorded in 1986 but not 1995.

As with 'lost' species, for most species recorded only in 1995 and three or fewer times, factors probably contributing to the observed pattern can be identified: 19 are migrants or nomads; 11 are difficult to identify; four are forest-floor birds; ten are scrub or open habitat birds (compared with three 'losses'); and only one was found only away from the lower Likau. Four resident species, each recorded 2-3 times, lack an obvious reason: Lesser Cuckooshrike *Coracina fimbriata*, Black-and-red Broadbill *Cymbirhynchos macrorhynchos*, Large Woodshrike *Tephrodornis gularis* and Mangrove Whistler.

Globally Threatened and Near-threatened species

In both years, 16 Globally Threatened or Near-threatened species were found in the park, with 12 common to both years. The Near-threatened Brown-backed Flowerpecker was also recorded provisionally in both years. Thus, there is no evidence of a disproportionate loss of species of elevated conservation interest. However, it may be of concern that two species in Collar *et al.* (1994) showed a decline in records between the two years, while none of the eight species showing an increase was listed in that work.

Future additions

Many species were recorded in one year but not the other (73, from a total of 235 including provisional identifications), suggesting that many more remain to be found in Similajau. At least 60 landbirds not yet recorded from the park are likely to occur on the basis of habitat preferences and geographical and altitudinal ranges. Nocturnal species and Palearctic migrants have been particularly under-recorded. Surprisingly few species of flycatchers, babblers, pittas, woodpeckers and pigeons have been found. However, woodpeckers and babblers appear to show reduced sympatry in Sarawak, compared with elsewhere in the Sundaic subregion, for unknown reasons (Wells 1985).

CONCLUSIONS

The foregoing analysis shows that for most species showing an apparent change in status between the two years, only rarely can the change in records be taken as a real change in the bird's status. Distinguishing real changes in the bird community at the level of a single site such as Similajau N.P. is likely to be difficult, because species likely to show greatest change are those already on the edge of their ecological range, and thus probably only ever at low density in Similajau N.P.

The importance of Similajau

With a total of about 230 species, Similajau compares well with other surveyed parts of Borneo (Table 5). Coverage varies between sites included in this comparison; only Barito, Danum and Sepilok include observations from more than one visit. Although further work at any of them would doubtless provide new species, various patterns are evident.

The high total at Similajau is partly due to migrant species, but even when only resident species totals are compared, Similajau still has the third longest list. Barito Ulu, with the highest total, shows a much wider altitudinal range than does any other site in the comparison, while Barito and the other two sites with totals comparable to Similajau N.P. (Danum Valley and Tanjong Puting) are all much bigger than is Similajau. Similajau has many coastal species and when comparison is restricted to forest-dependent species, it appears that the narrow altitudinal range and perhaps small area may limit the species richness of Similajau N.P., as it drops to fourth place and is over 20 species poorer than are some sites. The site with the most similar habitat to Similajau is Tanjong Puting. The latter has more swamp forest than does Similajau and covers 3,000 km² compared with the 71 km² of Similajau. Both were surveyed with similar observer effort and both support similar numbers of resident and forest-dependent resident species.

Protection of species under elevated risk of extinction is an important aim for protected areas. Similajau supports five Globally Threatened and 15 Globally Near-threatened species; only Danum Valley and Tutoh support more Globally Threatened species (six each; Table 5). While four other sites support more Globally Near-threatened species, even Danum Valley, with the most, has only four more than Similajau. Further Threatened and Near-threatened species probably remain to be found in Similajau N. P.: of the 20 recorded so far, eight are known from only 1-2 records.

Borneo supports almost 40 endemic species, of which about one half depend on lowland forest (Wells 1985, modified to follow the taxonomy of Inskipp *et al.* 1996). Only four were found: Bornean Ground Cuckoo, Bornean Bristlehead, Bornean Wren Babbler and Yellow-rumped Flowerpecker. Dusky Munia *Lonchura fuscans* is also almost endemic to Borneo (it also occurs on Cagayan Sulu, Philippines), but occurs widely outside forests (Smythies 1981). Seven of the unrecorded forest endemics are slope specialists; it would not be surprising to find one or two of them in Similajau. Three lowland endemics would be major extensions of known range if they occurred in Similajau N.P. The only endemics which might reasonably be expected in the park are Blue-headed Pitta *Pitta baudii* and Black-throated Wren Babbler *Napothera atrigularis*; Bornean Peacock Pheasant *Polyplectron schleiermacheri* might also occur and the status of White-crowned Shama in this part of Sarawak is not clear (see above). The

	Similajau	Barito	Danum	Kutai	Semengoh	Sepilok	T. Puting	Tutoh
Total species	229	233	233	142	147	138	207	191
Resident species	189	223	214	141	143	137	200	181
Forest-dependent residents	167	199	200	130	136	123	163	173
Globally Threatened species.	5	4	6	3	1	3	3	7
Globally Near -threatened species.	15	18	20	9	7	9	17	16
Endemics	4	15	10	4	2	7	2	10
Altitudinal range (m)	0-110	130-1,000	150-250	0-40	0-150	0-140	0-5400	0-600

Forest-dependent species are as defined by Wells (1985).

Site data are from: this study (Similajau), Wilkinson *et al.* (1991a; Barito Ulu); Lambert (1992; Danum); Pearson (1975; Kutai); Fogden (1976; Semengoh and Tutoh); De Silva (1981; Sepilok); and Nash and Nash (1986; Tanjong Puting).

Table 5: Bird communities at eight primarily lowland sites in Borneo.

other four sites in Table 5 which have all land below 200 m also support few endemics. Further analysis is clearly necessary to establish whether extreme lowland sites truly support few endemics.

Focus on individual species may obscure the overall problem of 'bird communities facing wholesale collapse through the mass conversion of natural forest to other uses' (Wells 1985). Lowland evergreen mixed dipterocarp forest has the most species-rich and the most threatened bird fauna in Malaysia, with the highest richness below the hill foot boundary (Wells 1985). Similajau N.P. supports such forest, although the park was gazetted primarily for its coastline. Beach habitats are not well represented in Bornean protected areas, either Malaysian or Indonesian. The coastal resident of most conservation importance (Malaysian Plover) appears to be extinct in Similajau (although specific management of human pressure could probably bring it back) and the sandy beaches appear to be important for few other resident bird species. Thus, for bird conservation purposes, protection of Similajau N.P. is particularly important for its forests.

Protection of Similajau may not be important only for the birds of the national park itself. Wells (1985) suggested that for many primarily lowland species, populations on slopes may depend on regular upward dispersion from conspecifics in the lowlands. Thus, bird populations in Similajau N.P. may be important in maintaining populations on the nearby Mount Dulit. The felling of the Similajau Forest Reserve is likely to have prejudiced this function and it is likely to inhibit dispersal from the slopes and hills into the lowlands of the park. It is possible that peat forests and *kerangas*, which cover parts of the park, also need regular dispersal from forest on more productive soils (Wells 1985).

In Sarawak, widespread shifting cultivation has degraded large areas of primary lowland forest. This appears never to have happened in Similajau N.P., and furthermore the absence of indigenous forest people means that culturally sensitive issues related to forest use are unlikely to impede the park's protection and management. The value of the Danum Valley Conservation Area (Sabah) from both scientific and conservation perspectives is greatly enhanced by the near-absence of hunting and shifting cultivation (Marsh and Greer 1992). Thus Similajau is likely to be a particularly effective place to concentrate conservation activity.

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Some observations on the nesting activities of Chestnut-headed Bee-eaters *Merops leschenaultii* and Green Bee-eaters *M. orientalis* in Chittagong, Bangladesh

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During the winter of 1991, I observed the nesting activities of the two species of bee-eaters in a hillock at Chittagong city (22°03'N 91°08'E), Bangladesh. The city has many hillocks at elevations below 100 m. The Prabartak hill is one such, and is situated in front of the local medical college. Its elevation ranges from 80-100 m, and covers an area of about 1,000 m². The top of the hill was flattened in the past to accommodate an orphanage, a students' hostel and a school. The north and west facing slopes support some denuded remnants of former semi-evergreen forest, that existed all over the hilly areas of Chittagong nearly half a century ago. On the other sides, the hill has been subjected to excessive human activities, including the establishment of housing units and the removal of earth. These sides are exposed to severe erosion following monsoon rain. Thus steep slopes appeared with no visual barrier in front. These steep earth banks attracted numbers of breeding bee-eaters *Merops*.

From the end of December 1990 until April 1991 I kept notes on the nesting activities of some birds on Prabartak hill. These included the Chestnut-headed Bee-eater *Merops leschenaultii* and Green Bee-eater *M. orientalis*. They utilized the earth banks for nesting purposes.

A pair of Chestnut-headed Bee-eaters appeared near the earth bank on 2 January 1991. My attention was drawn when I saw them frantically digging in the earth bank. Whilst one bird was digging the other kept a constant vigil from a nearby perch. Upon sighting an intruder, the bird on watch uttered a specific call that alerted the digger, who would immediately leave the nesting tunnel and join the waiting partner in mobbing the predator, usually a House Crow *Corvus splendens*.

The digging of the tunnel apparently continued for almost a month, because during this period the digging bird did not spend long enough in the tunnel for it to be incubating. At the end of this time the partners started to spend periods of 10-15 minutes inside the tunnel, indicating that they were busy incubating. The longest single session of incubation was 25 minutes.