

A STUDY OF THE ECOLOGICAL DISTRIBUTION of  
RESIDENT AND MIGRATORY BIRDS ALONG THE RAPTI AND NARAYANI RIVERS  
in THE ROYAL CHITWAN NATIONAL PARK  
NOVEMBER and DECEMBER 1982

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A REPORT to THE DEPARTMENT OF NATIONAL PARKS AND WILDLIFE CONSERVATION, NEPAL

by

JOHN B. HALLIDAY B Sc (Department of Forestry and Natural Resources,  
University of Edinburgh.)

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## I INTRODUCTION

More than half the boundary of the Royal Chitwan National Park (Nepal) is delineated by rivers, so the riverine influence is a very important factor in the Park's ecology. This includes extensive faunistically valuable flood plains of these rivers lying at 130 - 190 m above sea level.

The two major rivers were chosen for this study, the Rapti which forms the northern boundary of the eastern portion of the Park, and the Narayani which roughly delineates the western Park boundary and is the third largest river in Nepal. These rivers, their banks and islands, support a large and diverse population of resident and migratory birds, viz. Cormorants, Herons, Storks, Ducks, Waders, Gulls, Terns and Kingfishers. These birds depend on secure feeding and resting sites along the river banks and islands. The modification of the riverain habitat and increased human disturbance associated with land use changes would be a serious threat and could have an adverse effect on these important bird populations.

The Rapti river has its northern bank (outwith the National Park) extensively cultivated and only narrow strips of forest remain along the main banks of the Narayani (outwith the Park). The southern bank of the Rapti, the extensive islands and lower section of the Narayani (within the Park boundary) remain largely secure. The continuous threat from forest clearance for cultivation and associated increase in human disturbance makes urgent the need to assess the abundance and relative distribution of riverain bird species and the possible consequences of habitat destruction.

This pioneering study should be an important contribution to the understanding of the riverain habitat and the resident and migratory bird populations which it supports, together an integral component of the Royal Chitwan National Park ecosystem.

## II AIMS

The main objectives of this survey were:

- 1) to determine the diversity, abundance and relative distribution of resident and migratory birds using the Rapti and Narayani Rivers, their banks and islands;
- 2) to relate the observed patterns of density and distribution to riverain habitat features (physical features, adjacent land-use, bankside vegetation and human disturbance), particularly within the context of the implications of land management.

## III LIMITS OF THE STUDY AREA

The study area was limited to the Rapti and Narayani Rivers, their banks and islands, along the boundaries of the Royal Chitwan National Park. Each river was divided into sections (Table 1) with respect to adjacent land use (outwith the Park) and access/crossing points. On the Rapti 49 km were covered and on the Narayani 75 km.

TABLE/

RAPTI and NARAYANI STUDY AREA, showing Section Boundaries.

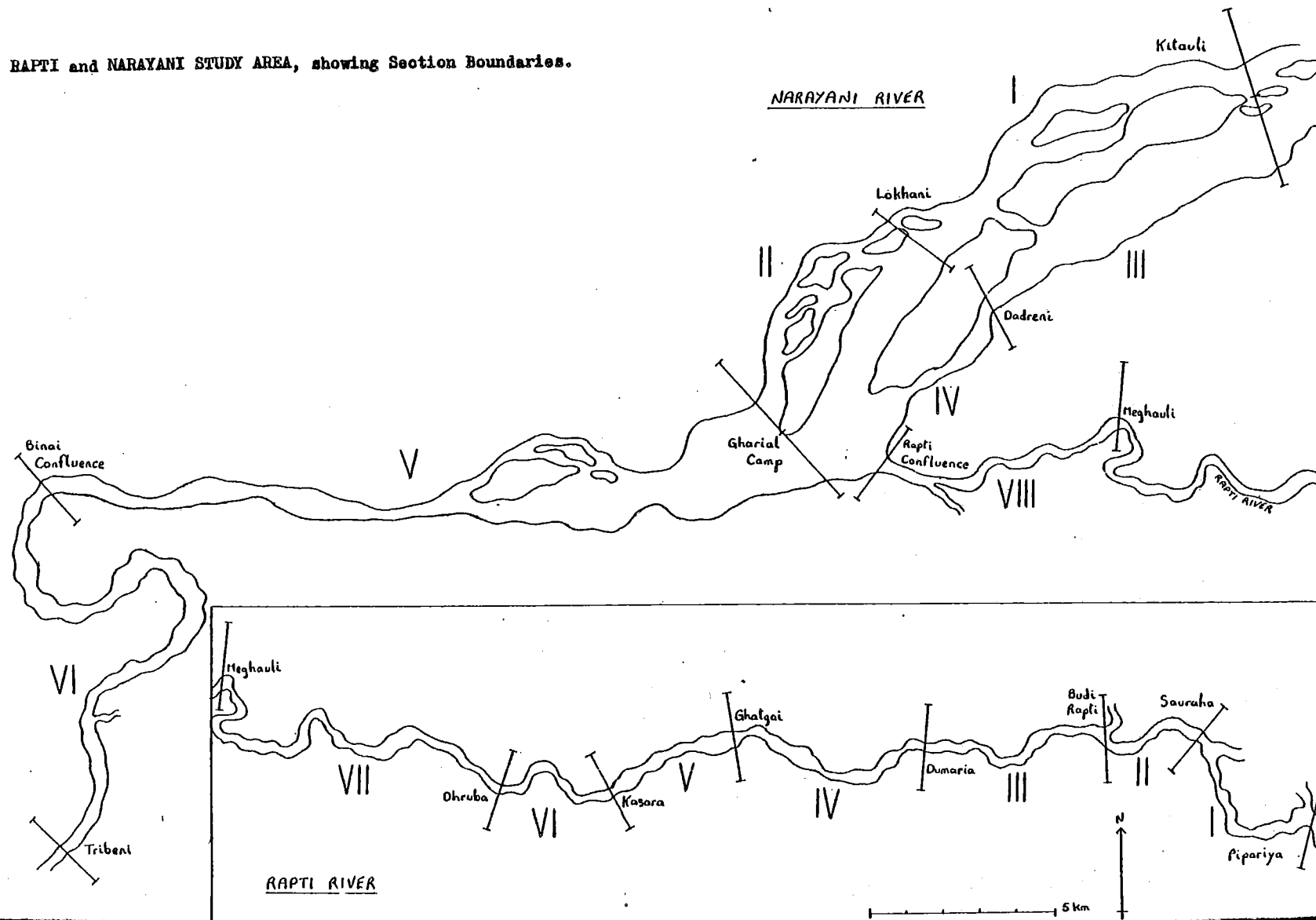


TABLE 1 DETAILS OF SECTIONS

<u>RAPTI RIVER</u>		<u>Limits of Section</u>	<u>Length of Section (km)</u>
Section	I	Pipariya to Sauraha	5.5
	II	Sauraha to Budi Rapti	3.4
	III	Budi Rapti to Dumaria	5.7
	IV	Dumaria to Ghatgai	6.4
	V	Ghatgai to Kasara	4.0
	VI	Kasara to Dhruba	4.3
	VII	Dhruba to Meghauli	12.6
	VIII	Meghauli to Rapti Confluence	7.3
<u>NARAYANI RIVER</u>			
Section	I	Kitauli to Lokhani Check Post	10.9
	II	Lokhani Check Post to Gharial Project Camp	7.8
	III	Kitauli to Dadreni Check Post	9.5
	IV	Dadreni Check Post to Gharial Project Camp	7.0
	V	Gharial Project Camp to Binai Confluence	22.5
	VI	Binai Confluence to Tribeni	17.7

IV STUDY PERIOD

The study area was completely covered on at least one occasion between 4 November and 29 December. Two visits were possible to the Rapti and Sections II and V of the Narayani. Details of each visit are shown in Table 2.

TABLE 2 DATES OF VISITS TO RIVERS

<u>Visit</u>	<u>River</u>	<u>Section</u>	<u>Start</u>	<u>Finish</u>
A	* Rapti	I to VIII	29 November	7 December
	Narayani	II, V and VI	22 November	28 November
B	Rapti	I to VIII	26 December	29 December
	Narayani	I to V	18 December	26 December

\* Additional visits were possible to Sections I to V (Sauraha to Kasara) between 4 and 24 November.

V SURVEY PROCEDURE

The area surveyed was limited to the main river channels, their banks and islands, and only those species directly associated with the rivers were censused (species associated with forest, grassland and cultivation were not included). Obviously the intricate system of channels and islands encountered on the Narayani did/

did not permit full coverage and populations on this river should be treated as minimum estimates. The main river banks and islands were treated separately in each section.

Counts and observations of feeding and resting birds were carried out as much as possible on foot as more accurate results were obtained in this way. Dug-out canoes had to be used however in certain situations on the Narayani River. It was usually only possible to cover the rivers from one bank, e.g. all sections of the Rapti were covered from the north bank. Birds on the opposite bank were occasionally difficult to observe, especially the small waders, and there was therefore a bias and possibly an underestimate of species populations.

Habitat features (physical features, adjacent land use, bankside vegetation) and degree of human disturbance were also recorded.

Observations were recorded in notebooks as maps were not available to use in the field.

#### VI ANALYSIS OF RESULTS

All sightings of each species were summed for each section and a frequency (sightings/visit/km) calculated for each species in each section. This data is presented in a table followed by a brief text (for each of the 57 species recorded) discussing the census data and assessing the role of various habitat features in determining distribution or density. Maps are also presented showing distribution and density of family groups and important species.

## VII RESULTS

### 1) PHYSICAL AND VEGETATION FEATURES

Time did not allow mapping in the field of relevant habitat features. A brief general description of each section, including a note on human disturbance, and a comparison of the two rivers follows.

#### RAPTI RIVER

##### Section I (5.5 km) Pipariya to Sauraha

The island east of Sauraha is included within the boundaries of the Park and the southern edge was covered by the survey. This section extended from the eastern extremity of the island downstream to Sauraha. An extensive sandy/pebbly bank, small sandy islands and silt deposits which became more evident as the water level dropped, and shallow channels, were important features.

Grassland was predominant on the north (island) bank. Riverain forest was an important feature of the south bank but this bank was largely cultivated and devoid of vegetation.

Disturbance was high along the south bank from villagers walking to and from the river crossing at Sauraha.

##### Section II (3.4 km) Sauraha to Budi Rapti

This section extended from Sauraha to the confluence of the Budi Rapti. Sandy/pebbly islands and banks with shallow channels near the confluence were important features. As in section I sandy islands and silt deposits became more evident as the dry season progressed and water levels fell. Steep eroded banks were a feature of the north bank.

The north bank was entirely cultivated and devoid of vegetation while the south (Park side) bank was grassland.

Disturbance obviously was more prolific on the north bank.

##### Section III (5.7 km) Budi Rapti to Dumaria

This important section extended from the Budi Rapti confluence to the boundary of sal forest outside the Park opposite Dumaria. Extensive silt deposits opposite Dumaria Creek were an important feature. Sandy/pebbly banks (scarce on the south side), small islands and shallows were regular features.

This section was obviously of great habitat interest in that the original sal forest remained on the north bank. The south bank was largely grassland which usually extended to the edge of the river.

Disturbance was negligible along this section.

#### Section/

Section IV (6.4 km) Dumaria to Ghatgai

This section extended from the forest edge to the boundary of cultivation at Ghatgai. Extensive sand/mud banks, islands and shallow channels opposite Jarneli were outstanding. Sand/pebble deposits were regularly noted, mainly on the north bank.

Although the forest had been removed on the north bank, it was still uncultivated and cattle grazed on the scrubby vegetation. Grassland with some riverain forest extending down to the river was the feature of the Park side.

This section was relatively undisturbed.

Section V (4.0 km) Ghatgai to Kasara

This section extended from Ghatgai village where a creek enters the river to the river crossing point at Park H.Q., Kasara. Sedimentary deposits, mainly on the north bank, sandy islands and shallow channels were again well represented.

The north bank was mainly cultivated whereas riverain vegetation (grassland/forest) was predominant on the south.

There was high disturbance on the village side of the river.

Section VI (4.3 km) Kasara to Dhruba

This section extended from the crossing at Kasara to the crossing at Dhruba. Extensive deposits of sand and silt were noted opposite Kasara and were a regular feature of the north bank. Sandy/pebbly banks were relatively common on the south and there were a few small sandy islands.

There was a narrow fringe of natural vegetation along the north bank and a mixture of sal, riverain forest and grassland made up the south.

Disturbance was high on the north bank.

Section VII (12.6 km) Dhruba to Meghauli

This long section extended from the river crossing at Dhruba to the crossing point at Meghauli. Sedimentary deposits of silt, sand and pebbles formed extensive banks, especially on the north side, and islands. Steep eroded banks were a regular feature on the north side.

The north bank was mainly cultivated while the south side had a mixture of grassland and riverain forest.

Disturbance from villagers and fishermen was extremely high on the north bank.

Section VIII (7.3 km) Meghauli to Rapti Confluence

This final section extended from the crossing point at Meghauli to the confluence with/



with the Narayani. The Rapti was joined by a major tributary, the Reu River, along this section. Silty/sandy banks (north side) and islands were particularly extensive in the vicinity of the Reu and Narayani confluences.

The north side was mainly cultivated and riverain forest, extending to the edge of the river, predominated on the Park side.

Again high disturbance was noted on the north bank.

#### NARAYANI RIVER

##### Section I (10.9 km) Kitauli to Lokhani Check Post and Section II (7.8 km) Lokhani Check Post to Gharial Project Camp

The Narayani forks and diverges to form a maze of channels and islands, especially numerous in Section II. It follows a course of intermittent turbulence, where it runs over stones and rapids, and placidity. Stony/sandy banks were a feature of the swifter flowing channels and a narrow fringe of mud/sand in the quieter stretches. Algal growth on the mud, sand and stones was noted and was particularly prolific along the island fringes downstream from Lokhani.

Island vegetation was a mixture of grassland and riverain forest. Along the main river bank, cultivation predominated although there were short stretches of forest to the river's edge in both sections.

Disturbance was confined to the cultivated and village sections along the main river bank.

##### Section III (9.5 km) Kitauli to Dadreni Check Post and Section IV (7.0 km) Dadreni Check Post to Gharial Project Camp

Large islands and channels were again predominant but not as numerous as in sections I and II. Sandy/stony banks were an important feature and were especially extensive in the vicinity and downstream from the Rapti confluence (Section IV).

Riverain forest was well represented on islands in Section IV whereas grassland was predominant in Section III. The main river bank was extensively cultivated.

Disturbance along the main river bank was the highest encountered on the Narayani.

##### Section V (22.5 km) Gharial Project Camp to Binai Confluence

The channels converge below the Gharial Camp to form a wide channel which soon divides to form several large islands and channels. These channels again converge towards the Binai Confluence. The Narayani was generally fast flowing and turbulent along this section with extensive banks of stones and sand an outstanding feature.

Grassland extended along most of the south (Park side) bank, with forest increasing in importance and then predominating towards the Binai Confluence. Grassland also/

also predominated on the islands. Forest and cultivation were intermittent on the north bank.

Disturbance was confined to the cultivated sections of the north bank.

#### Section VI (17.7 km) Binai Confluence to Tribeni

The Narayani is joined by a large tributary flowing in from the north, Binai Khola. At this point the river narrows, deepens and turns sharply south to cut its way through a deep gorge in the Someswar Hills. The river is lined by cliffs and boulder scree with intermittent sandbanks where the river bends. The river widens at Tribeni.

Sal jungle dominates the steep slopes.

The riverain habitat is therefore unique in this section. With the National Park on both sides the river is undisturbed by people.

#### GENERAL HABITAT COMPARISONS OF THE RAPTI AND NARAYANI RIVERS

The most outstanding features of the Rapti River were the extensive alluvial deposits which formed islands, shallow channels and sandbanks. Erosion and deposition were particularly evident along the north bank where there was no natural vegetation to keep these processes in check. The Rapti has its northern bank extensively cultivated and human disturbance was invariably high. Natural riverain vegetation however persisted on the south bank (Park side) and disturbance was negligible.

Unlike the Rapti, the Narayani divided repeatedly to form a complicated system of channels and islands. Deposited material ranged from silt which formed a narrow strip along quieter stretches to sand and stones which formed extensive banks where the river was more turbulent. Algal growth on this aluvium, most prolific along sheltered island fringes, was an important feature of this river. The islands, which fell within the Park boundary, supported riverain vegetation and were undisturbed. Disturbance was confined to cultivated sections along the main river bank. Cliffs, boulder scree and sal jungle on both banks were features unique to the lower section (VI) of the Narayani.

VII 2) ORNITHOLOGICAL RESULTS:

## DISTRIBUTION OF SPECIES CLOSELY ASSOCIATED WITH THE RIVERS

CORMORANTS and DARTER (PHALACROCORACIDAE)

This group consisted almost entirely of Large Cormorants P. carbo.

LARGE CORMORANT Phalacrocorax carbo

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		350	0	5	0	234	0	7	0	2	0	40	2	344	3	10	0	992	5
Sightings/ visit/km		31.8		0.7		20.5		0.5		0.2		4.9		13.8		0.7			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		-	1	10	2	-	20	-	36	34	796	1	-	45	855
Sightings/ visit/km			0.1		0.8		2.1		5.1		18.4		0.1		

Next to Ruddy Shelduck Tadorna ferruginea this was the most abundant species present during the survey. Large flocks of several hundred birds were frequently noted along the Rapti River in November; 350 roosting on sandbanks above Sauraha (18/11), 234 roosting in trees at Dumaria (21/11) and a fishing flock of 340 birds at Meghauri (3/12). There is evidence of a shift in distribution of Large Cormorants from the Rapti to Narayani River in December. A large fishing flock of c750 birds was frequently observed near the Gharial Project Camp between 19 and 26 December.

DARTER Anhinga rufa

RAPTI RIVER No sightings on river.

NARAYANI RIVER Singles were recorded near Tented Camp (28/11) and just below Gharial Project Camp (18/12).

HERONS (ARDEIDAE)

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		22	7	22	14	40	44	133	36	101	29	38	46	56	57	30	29	442	262
Sightings/ visit/km		2.6		5.3		7.4		13.2		16.2		9.8		4.5		4.0			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		-	35	19	34	-	21	-	27	35	128	7	-	61	245
Sightings/ visit/km			3.2		3.4		2.2		3.9		3.6		0.4		

This/

This group of resident species was largely represented by Pond Heron and Egrets. Whereas the former was regularly distributed throughout the survey period, there is some evidence of local movement of egrets from the Rapti to the Narayani in December. Heron densities were generally higher on the Rapti River, the roosting concentrations of egrets near Ghatgai in November contributing to higher densities in Sections IV and V. Excepting these roosting egrets, Herons were regularly distributed along both rivers.

GRAY HERON Ardea cinerea

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		1	0	0	0	2	2	0	2	1	0	0	2	1	1	1	0	6	7
Sightings/visit/km		0.1		0		0.4		0.2		0.1		0.2		0.1		0.1			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		-	0	1	-	-	2	-	1	4	3	0	-	5	6
Sightings/visit/km		0		0.1		0.2		0.1		0.2		0			

The few sightings, usually of single birds, were widely distributed along both rivers.

LITTLE GREEN HERON Butorides streatus

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		0	0	0	0	1	3	0	0	0	0	0	0	0	2	0	0	1	5
Sightings/visit/km		0		0		0.4		0		0		0		0.1		0			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		-	0	1	0	-	1	-	0	0	2	1	-	2	3
Sightings/visit/km		0		0.1		0.1		0		0.1		0.1			

This species was associated with the forested sections of the rivers. It was present in small numbers and was usually flushed from bankside cover.

POND HERON Ardeola grayii

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		6	1	17	10	15	16	4	7	18	14	18	17	19	18	13	12	110	95
Sightings/visit/km		0.6		4.0		2.7		0.9		4.0		4.1		1.5		1.7			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		-	8	5	7	-	1	-	1	1	6	1	-	7	23
Sightings/visit/km		0.7		0.8		0.1		0.1		0.2		0.1			

This relatively abundant Heron was widely distributed but clearly favoured the Rapti River. There was no evidence of movement during the survey.

LARGE/

LARGE EGRET *Egretta alba*

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Sightings	1	0	0	0	5	3	2	3	6	1	3	1	5	9	5	2	27	19
	Sightings/ visit/km	0.1		0		0.7		0.4		0.9		0.5		0.6		0.5			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Sightings	-	0	6	2	-	0	-	3	3	14	0	-	9	19
	Sightings/ visit/km	0		0.5		0		0.4		0.4		0			

Although scarce c.f. other *Egretta* spp, Large Egrets were regularly recorded (usually single birds) and widely scattered along the two rivers.

INTERMEDIATE EGRET *Egretta intermedia*

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Sightings	3	1	0	0	3	1	35	11	43	3	2	3	8	1	0	1	94	21
	Sightings/ visit/km	0.4		0		0.4		3.6		5.7		0.6		0.4		0.1			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Sightings	-	7	2	9	-	0	-	0	7	30	1	-	10	46
	Sightings/ visit/km	0.6		0.7		0		0		0.8		0.4			

Like other species in this group, *E. intermedia* favoured the Rapti River. Small concentrations of roosting birds were noted at Ghatgai; 35 on 30/11 and 43 on 4/12. It was usually present in small scattered flocks along both rivers.

LITTLE EGRET *Egretta garzetta*

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Sightings	11	5	5	4	14	19	92	13	33	11	15	23	23	26	11	14	204	115
	Sightings/ visit/km	1.5		1.3		2.9		8.2		5.5		4.4		1.9		1.7			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Sightings	-	20	4	16	-	17	-	22	20	73	4	-	28	148
	Sightings/ visit/km	1.8		1.3		1.8		3.1		2.1		0.2			

This was the most abundant egret recorded along the rivers in Chitwan, especially along the Rapti in November. A roosting congregation of 92 birds was noted near Ghatgai on 21 November. The marked decline in numbers on the Rapti and possible influx to the Narayani in December suggests some movement of Little Egrets between the two rivers. The species was widely distributed.

STORKS/

STORKS (CICONIIDAE)

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings	Visit	3	0	2	0	3	0	4	1	8	0	0	0	2	0	1	0	23	1
Sightings/visit/km		0.3		0.3		0.3		0.4		1.0		0		0.1		0.1			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings	Visit	-	9	10	1	-	4	-	0	10	16	0	-	20	30
Sightings/visit/km		0.8		0.7		0.4		0		0.6		0			

Storks were relatively scarce but regularly distributed along both rivers. The lack of Storks on the Rapti in December may reflect local and migratory movements.

OPEN-BILLED STORK *Anastomus oscitans*

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings	Visit	1	0	1	0	0	0	1	1	0	0	0	0	0	0	1	0	4	1
Sightings/visit/km		0.1		0.1		0		0.2		0		0		0		0.1			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings	Visit	-	8	1	0	-	0	-	0	0	0	0	-	1	8
Sightings/visit/km		0.7		0.1		0		0		0		0			

There were a few records of single birds feeding along the Rapti River. 8 birds were noted roosting in trees near Lokhani on the Narayani (23/12).

WHITE-NECKED STORK *Ciconia episcopus*

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings	Visit	1	0	1	0	0	0	2	0	3	0	0	0	1	0	0	0	8	0
Sightings/visit/km		0.1		0.1		0		0.2		0.4		0		0.1		0			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings	Visit	-	0	2	0	-	2	-	0	0	2	0	-	2	4
Sightings/visit/km		0		0.1		0.2		0		0.1		0			

The few sightings, usually of single birds, were widely distributed but absent from the Rapti in December.

BLACK/

BLACK STORK *Ciconia nigra*

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		1	0	0	0	3	0	1	0	5	0	0	0	1	0	0	0	11	0
Sightings/ visit/km		0.1		0		0.3		0.1		0.6		0		0.1		0			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		-	1	7	1	-	2	-	0	10	14	0	-	17	18
Sightings/ visit/km		0.1		0.5		0.2		0		0.5		0			

Small numbers of this migratory stork were noted at several localities along the Rapti River in November (5 over Kasara on 4/12). Small parties were noted roosting on banks along the Narayani throughout the period, 7 near Tented Camp (28/11), 10 below Gharial Camp (23/11) and 12 below Gharial Camp (19/12). Small numbers probably overwinter along the Narayani.

IBISES (THRESKIORNITHIDAE)BLACK IBIS *Pseudibis papillosa*

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		20	0	5	0	1	4	20	4	6	4	27	0	28	11	16	0	123	23
Sightings/ visit/km		1.8		0.7		0.4		1.9		1.2		3.1		1.5		1.1			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		-	76	34	4	-	0	-	0	1	17	0	-	35	97
Sightings/ visit/km		7.0		2.4		0		0		0.8		0			

This resident species was often noted feeding in fallow fields adjacent to the rivers but was also widely distributed along the river banks. Highest densities were recorded where there were roosting flocks of up to 40 birds, which were usually associated with riverside trees; 20 Ghatgai (1/12), 26 Dhruba (2/12), 28 Meghauri (3/12), 26 Kitauri (23/12) and 40 Lokhani (23/12). The fall in numbers on the Rapti in December probably reflects some local movement, which was also evident in Egrets and Storks.

GEESE AND DUCKS (ANATIDAE)

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		705	222	112	318	166	165	132	169	87	56	114	61	456	428	212	143	1984	1562
Sightings/ visit/km		84.3		63.2		29.0		23.5		17.9		20.3		35.1		24.3			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		-	1874	1754	2337	-	2323	-	785	2034	3310	143	-	3931	10,629
Sightings/ visit/km		171.9		262.2		244.5		112.1		118.8		8.1			

This/

This important group of migratory birds were widely distributed and present in outstanding densities on the Narayani. There was evidence of a build up in the wintering population on the Narayani in December. Notable concentrations of Ducks were recorded along the island fringes between Lokhani and Tented Camp and upriver from Dadreni (near Kitauli). The sandy islands upriver from Sauraha on the Rapti River supported a high diversity and a relatively high density of Ducks (7/12).

The islands of the Narayani provide secure resting and feeding areas - a dense growth of algae was noted along the island fringes - for Geese and Ducks and thus the high species diversity and density along this river.

BAR-HEADED GOOSE Anser indicus

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Sightings	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0
	Sightings/visit/km	0.4		0		0		0		0		0		0		0			
NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL					
		A	B	A	B	A	B	A	B	A	B	A	B	A	B				
	Sightings	-	0	0	30	-	0	-	0	52	13	0	-	52	43				
	Sightings/visit/km	0		1.9		0		0		1.4		0							

This species was present in small numbers mainly along the Narayani. Small migrating flocks were noted on sandbanks; 52 just below the Gharial Camp (27/11) and 30 at Lokhani (23/12). A small party of 4 birds at Sauraha (9/11) was the only record of the species on the Rapti.

RUDDY SHELDUCK (BRAHMINY DUCK) Tadorna ferruginea

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Sightings	573	221	103	303	150	131	132	150	83	51	112	61	280	260	203	142	1636	1319
	Sightings/visit/km	72.2		59.7		24.6		22.0		16.7		20.1		10.7		23.6			
NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL					
		A	B	A	B	A	B	A	B	A	B	A	B	A	B				
	Sightings	-	1685	1654	2020	-	1605	-	755	1811	2830	82	-	3547	8895				
	Sightings/visit/km	154.6		235.5		168.9		107.9		103.1		4.6							

This was by far the most abundant species recorded along the riverbanks with particularly high densities along the Narayani. Ruddy Shelducks were widely distributed in pairs and the upper sections of the Narayani were of outstanding importance. Sandbanks at Sauraha supported the highest concentrations on the Rapti River. This species clearly favoured sandy islands and shallows as feeding and resting areas, where/



where disturbance was minimal, and thus the high concentrations along the island fringes of the Narayani. Local and migratory movements would explain monthly variation in distribution and abundance of this important wintering species.

EURASIAN SHELDUCK Tadorna tadorna

Sightings of this scarce migrant were noted at Sauraha (a single bird was present here from 17/11 till 6/12), Dumaria (single on 21/11) and Kitauli (single on 23/12).

PINTAIL Anas acuta

RAPTI RIVER No sightings on river.

NARAYANA RIVER	Section I		Section II		Section III		Section IV		Section V		Section VII		TOTAL	
	Visit	Visit	Visit	Visit	Visit	Visit	Visit	Visit	Visit	Visit	Visit	Visit	Visit	Visit
Sightings	-	0	5	68	-	0	-	0	50	74	0	-	55	142
Sightings/visit/km		0		4.7		0		0		2.8		0		

Small flocks of 5 to 60 birds were noted along the middle section of the Narayani River. Scattered parties of Pintail fed along the island fringes downstream from Lokhani (28/11 and 24/12) and below the Gharial Camp (flocks of 50 on 23/11 and 60 on 19/12).

COMMON TEAL Anas crecca

RAPTI RIVER	Section I		Section II		Section III		Section IV		Section V		Section VI		Section VII		Section VIII		TOTAL	
	Visit	Visit	Visit	Visit	Visit	Visit	Visit	Visit	Visit	Visit	Visit	Visit	Visit	Visit	Visit	Visit	Visit	Visit
Sightings	0	0	0	0	0	0	0	0	0	0	0	0	155	121	0	0	155	121
Sightings/visit/km		0		0		0		0		0		0		11.0		0		

NARAYANI RIVER	Section I		Section II		Section III		Section IV		Section V		Section VI		TOTAL	
	Visit	Visit	Visit	Visit	Visit	Visit	Visit	Visit	Visit	Visit	Visit	Visit	Visit	Visit
Sightings	-	64	25	72	-	c600	-	4	63	167	60	-	148	907
Sightings/visit/km		5.9		6.2		63.2		0.6		5.1		3.4		

The Common Teal was a relatively common migratory duck. Although widely distributed along the Narayani it was recorded only at one locality on the Rapti between Dhruba and Meghauli. Small flocks were widely scattered with notable concentrations of c 600 birds at Kitauli (23/12) and 121 birds between Dhruba and Meghauli (27/12).

SPOTBILL Anas poecilorhyncha

This was the only resident Duck recorded on the rivers. A small party of 4 birds was recorded upriver from Sauraha (7/12).

MALLARD/

MALLARD *Anas platyrhynchos*

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		10	0	0	0	0	26	0	0	0	0	0	0	0	0	0	0	10	26
Sightings/ visit/km		0.9		0		2.3		0		0		0		0		0			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		-	0	11	33	-	74	-	0	0	1	0	-	11	108
Sightings/ visit/km		0		2.8		7.8		0		0.1		0			

Small flocks of this relatively scarce Duck were recorded on both rivers, usually with other migratory ducks. A notable flock of 74 birds was with the large flock of Teal at Kitauli (23/12).

GADWALL *Anas strepera*

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		36	0	0	2	3	1	0	0	2	0	0	0	6	28	0	0	47	31
Sightings/ visit/km		3.3		0.3		0.4		0		0.2		0		1.3		0			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		-	100	23	26	-	0	-	6	12	79	0	-	35	211
Sightings/ visit/km		9.2		3.1		0		0.9		2.0		0			

Small flocks of up to 50 birds (2 flocks of 50 below Kitauli 23/12) were widely distributed along both rivers. Like other migratory ducks, the Gadwall favoured the Narayani River.

EURASIAN WIGEON *Anas penelope*

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		34	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	42	0
Sightings/ visit/km		3.1		0		0.7		0		0		0		0		0			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		-	0	30	80	-	0	-	0	0	4	0	-	30	84
Sightings/ visit/km		0		7.1		0		0		0.1		0			

This species was present in small flocks of up to 40 birds with other migratory ducks at a few localities, notably above Sauraha (34 on 7/12) and feeding along the island fringes downstream from Lokhani (parties of 10 to 40 birds on 28/11 and 24/12).

RED-CRESTED/

RED-CRESTED POCHARD Netta rufina

RAPTI RIVER No sightings on river.

NARAYANI RIVER A pair and a party of 3 were recorded near Lokhani (23/12).

MERGANSER (GOOSANDER) Mergus merganser

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Sightings	43	1	9	13	4	7	0	19	2	5	2	0	15	19	9	1	84	65
	Sightings/ visit/km	4.0		3.2		1.0		1.5		0.9		0.2		1.3		0.7			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Sightings	-	23	6	5	-	43	-	20	46	142	1	-	53	233
	Sightings/ visit/km	2.1		0.7		4.5		2.9		4.2		0.1			

Goosanders were widely distributed. Like other species in this group, relatively high numbers of this fish-eating duck were present on the Narayani in December. The single male in a group of 40 birds resting on sandbanks above Sauraha (7/12) reflected the predominance of females throughout the area.

BIRDS OF PREY (ACCIPIITRIDAE)

Fishing Eagles were scarce whereas Ospreys were regularly observed along the main rivers.

FISHING EAGLE Icthyophaga sp.

There were no sightings of Fishing Eagles along the main rivers. There were two records of single birds in the vicinity of the Rapti, at Dumaria Creek (16/12) - this was probably Himalayan Gray-headed Fishing Eagle I. nana - and on a lake near Bagmara (18/12) - this may have been an adult Pallas's Fishing Eagle Haliaeetus leucoryphus which was later reported nearby at the Rapti Confluence (5/1/83).

Two eagles, probably Fishing Eagles, were noted following the huge flock (c 750) of Large Cormorants on the Narayani River (26/12).

OSPREY/

OSPREY Pandion haliaetus

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		1	0	2	1	4	1	1	1	1	1	1	0	1	4	0	2	11	10
Sightings/ visit/km		0.1		0.4		0.4		0.2		0.2		0.1		0.2		0.1			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		-	1	1	1	-	1	-	1	5	5	0	-	6	9
Sightings/ visit/km		0.1		0.1		0.1		0.1		0.2		0			

Individual Ospreys were noted fishing along the lengths of both rivers (excepting the lower forested section of the Narayani) throughout the period.

FLOWERS (CHARADRIIDAE)

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		45	18	35	10	64	63	41	56	36	15	47	33	13	63	21	150	302	408
Sightings/ visit/km		5.7		6.6		11.1		7.6		6.4		9.3		3.0		11.7			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		-	23	32	20	-	12	-	13	22	39	9	-	63	107
Sightings/ visit/km		2.1		3.3		1.3		1.9		1.4		0.5			

This family was represented by both resident and migratory species. Flowers were widely distributed with greatest densities on the Rapti River. The sandy/pebbly conditions prevalent along the Rapti clearly favoured these resident and migratory populations.

RED-WATTLED LAPWING Vanellus indicus

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		4	0	4	0	9	4	0	9	7	2	11	8	3	12	0	1	38	36
Sightings/ visit/km		0.4		0.6		1.1		0.7		1.1		2.2		0.6		0.1			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		-	2	2	1	-	3	-	0	0	0	0	-	2	6
Sightings/ visit/km		0.2		0.2		0.5		0		0		0			

This resident Lapwing was present in small numbers. Pairs and small groups favoured the sandbanks and grassland along the Park edge of the Rapti River.

SFUR-WINGED/

SPUR-WINGED LAPWING Vanellus spinosus

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		17	3	6	4	24	22	6	20	16	5	6	2	3	13	7	10	85	79
Sightings/ visit/km		1.8		1.5		4.0		2.0		2.6		0.9		0.6		1.2			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		-	19	23	17	-	2	-	0	12	25	9	-	44	63

This relatively common resident Lapwing was present in small widely scattered groups on the stony banks of both rivers. A higher density between the Budi Rapti and Dumaria may reflect the lack of disturbance along this forested section.

EASTERN GOLDEN PLOVER Fluvialis dominica

RAPTI RIVER A single was recorded just upriver from Ghatgai roosting with a flock of 30 Kentish Flowers Charadrius alexandrinus (4/12).

NARAYANI RIVER No sightings on river.

LITTLE RING PLOVER Charadrius dubius

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		15	10	12	5	12	18	2	17	9	7	23	23	5	27	6	9	84	116
Sightings/ visit/km		2.3		2.5		2.6		1.5		2.0		5.3		1.3		1.0			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		-	2	6	1	-	6	-	10	4	8	0	-	10	27
Sightings/ visit/km		0.2		0.4		0.6		1.4		0.3		0			

Little Ring Flowers were widely distributed with greatest densities along the Rapti River. Sightings mainly of paired birds, territorial behaviour and previous breeding records would suggest that this is a resident population. The extensive sandbanks along the Rapti River provide ideal breeding, roosting and feeding areas for this species.

Concentrations of paired birds were noted opposite Kasara.

KENTISH/

KENTISH PLOVER Charadrius alexandrinus

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		9	5	13	1	19	19	32	10	4	1	7	0	2	11	8	130	94	177
Sightings/ visit/km		1.3		2.1		3.3		3.3		0.6		0.8		0.5		9.5			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		-	0	1	1	-	1	-	3	6	6	0	-	7	11
Sightings/ visit/km		0		0.1		0.1		0.4		0.3		0			

Like *C. dubius* Kentish Plovers favoured the sandy/pebbly beds of the Rapti River. Singles and small parties of this migratory wader were widely distributed with notable flocks of 120 at Meghauri (26/12) and 30 at Ghatgai (4/12).

SANDFIPERS, STINTS AND SNIPE (SCOLOPACIDAE)

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		82	55	53	50	183	144	149	198	110	67	84	132	157	276	53	74	871	996
Sightings/ visit/km		12.5		15.1		28.7		27.1		22.1		25.1		17.2		8.7			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		-	94	106	84	-	43	-	53	71	126	5	-	182	400
Sightings/ visit/km		8.6		12.2		4.5		7.6		4.4		0.3			

The Rapti River was of outstanding importance for this interesting family of migratory waders. Relatively high densities and a high species diversity, including sightings of scarce winter visitors were noted on this river. This sociable group was widely distributed with notable concentrations of feeding and roosting birds opposite Dumaria Creek and near Ghatgai, areas which were relatively undisturbed. Clearly the shallow water and extensive mud/sand flats prevalent along the Rapti provided a rich food supply for this important wintering population. There was evidence of migratory movement throughout the period, especially in December.

GREENSHANK Tringa nebularia

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		30	4	10	12	54	35	102	58	79	35	47	60	91	111	17	14	430	329
Sightings/ visit/km		3.1		3.2		7.8		12.5		14.2		12.4		8.0		2.1			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		-	78	80	56	-	9	-	16	27	70	2	-	109	229
Sightings/ visit/km		7.2		8.7		0.9		2.3		2.2		0.1			

This/

This was the most abundant migratory wader. Singles and small groups were widely distributed with greatest densities on the Rapti. Roosting flocks of 102 were noted above Ghatgai (4/12), 79 above Kasara (1/12), 40 below Kitauli (23/12) and 36 downstream from Lokhani (28/11) in undisturbed areas. The sand/mud banks along the Rapti clearly provided rich feeding areas for this important wintering population. Migratory movements would explain the decline in numbers on the Rapti in December.

COMMON REDSHANK Tringa totanus

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Sightings	2	4	1	2	8	5	2	7	3	8	7	20	8	49	0	5	31	100
	Sightings/ visit/km	0.5		0.4		1.1		0.7		1.4		3.1		2.3		0.3			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Sightings	-	0	2	4	-	0	-	0	2	6	0	-	4	10
	Sightings/ visit/km	0		0.4		0		0		0.2		0			

Like other waders, the Common Redshank clearly favoured the Rapti River and only a few were recorded on the Narayani. The Rapti wintering population was relatively low but widely distributed. There was evidence of movement in December when small flocks of up to 20 birds (Dhruba 27/12) were noted.

SPOTTED REDSHANK Tringa erythropus

Spotted Redshanks were not recorded until the end of the survey when several turned up on the Rapti River, 2 at Dumaria and singles at Ghatgai and Kasara (28/12).

WOOD SANDPIPER Tringa glareola

Wood Sandpipers turned up with T. erythropus; a single at Dumaria, 4 at Ghatgai and a single at Kasara (28/12).

GREEN SANDPIPER Tringa ochropus

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Sightings	1	4	3	3	12	17	2	10	2	6	6	11	6	18	2	3	34	72
	Sightings/ visit/km	0.5		0.9		2.5		0.9		1.0		2.0		1.0		0.3			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Sightings	-	10	7	2	-	3	-	0	1	6	0	-	8	21
	Sightings/ visit/km	0.9		0.6		0.3		0		0.2		0			

Single birds were widely distributed with greatest densities on the Rapti. Migratory movements of this relatively common Tringa would explain the build-up of numbers in December.

COMMON/

COMMON SANDPIPER Tringa hypoleucos

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Sightings	7	4	8	5	13	6	2	14	8	10	9	9	18	19	4	3	69	70
	Sightings/ visit/km	1.0		1.9		1.7		1.2		2.2		2.1		1.5		0.5			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Sightings	-	5	7	4	-	7	-	3	10	12	3	-	20	31
	Sightings/ visit/km	0.5		0.7		0.7		0.4		0.5		0.2			

Numbers and distribution of Common Sandpipers were similar to that of T. ochropus, though numbers were consistent throughout the period. They were usually noted in shallow water especially where there were riffles (as was T. ochropus).

LITTLE STINT Calidris minutus

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Sightings	0	0	4	0	3	1	0	4	0	0	0	0	0	2	0	3	7	10
	Sightings/ visit/km	0		0.6		0.4		0.3		0		0		0.1		0.2			

NARAYANI RIVER A sighting of a single bird above the Rapti Confluence (22/12).

Small parties of this scarce migratory wader were recorded on the mud flats of the Rapti River throughout the survey period, usually in the company of Temminck's Stint C. temminckii; 4 near Budi Rapti confluence (8/11 and 5/12), 3 opposite Dumaria Creek (5/12) and a single there (28/12), 3 near Meghauri and 2 near Dhruba (26/12), and 4 at Ghatgai (28/12).

TEMMINCK'S STINT Calidris temminckii

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Sightings	39	39	22	28	85	53	33	97	18	6	15	30	34	71	30	45	276	369
	Sightings/ visit/km	7.1		7.4		12.1		10.2		3.0		5.2		4.2		5.1			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Sightings	-	1	9	17	-	24	-	26	31	32	0	-	40	100
	Sightings/ visit/km	0.1		1.7		2.5		3.7		1.4		0			

Next to Greenshanks, Temminck's Stints were the most abundant waders on the rivers. Small parties were widely distributed, again the mud/sand flats of the Rapti supporting higher concentrations of this important wintering wader. Concentrated flocks of feeding birds were noted at Ghatgai and Dumaria (28/12), perhaps a reflection of a rich food supply and minimal disturbance.

DUNLIN/



DUNLIN Calidris alpinus

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		0	0	0	0	8	22	5	2	0	0	0	0	0	5	0	1	13	30
Sightings/ visit/km		0		0		2.6		0.5		0		0		0.2		0.1			

NARAYANI RIVER A small flock of 7 birds was noted feeding near the Rapti confluence (26/11).

The Dunlin was another scarce winter visitor recorded along the Rapti in December, notably a flock of 22 birds opposite Dumaria Creek (28/12). Small flocks of feeding birds were noted at Ghatgai, 5 on 1/12 and 2 on 28/12; Dumaria, 8 on 5/12; Meghauli, a single on 26/12; and Dhruba, 5 on 27/12.

CURLEW SANDPIPER Calidris ferruginea

Small parties of Curlew Sandpipers were recorded along the Rapti River throughout the survey period; 4 near Budi Rapti confluence (8/11), 3 upriver from Sauraha (9/11), 3 at Ghatgai (21/11 and 1/12) and a single (feeding with a Dunlin) at Dumaria (28/12). These are the first records of this species in the Royal Chitwan National Park and only the second for Nepal. There was thus evidence of autumn movement and small numbers overwintering.

FANTAIL SNIPER Capella gallinago

Singles and pairs were occasionally noted feeding along the rivers, singles at Sauraha (8/11), Dhruba (26/12), downstream from Lokhani (28/11 and 23/12) and pairs opposite Dumaria Creek (28/12) and Dhruba (27/12).

AVOCETS (RECURVIROSTRIDAE)AVOCET Recurvirostra avosetta

A party of 7 birds was recorded feeding on a sandbank above Sauraha (9/11); an important record of this scarce migratory wader.

THICK KNEES (STONE PLOVERS), (BURHINIDAE)

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		0	0	0	0	5	0	0	1	0	0	0	0	0	0	0	0	5	1
Sightings/ visit/km		0		0		0.4		0.1		0		0		0		0			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		-	0	0	0	-	8	-	3	12	7	1	-	13	18
Sightings/ visit/km		0		0		0.8		0.4		0.4		0.1			

The/

The crepuscular and nocturnal habits of these two resident species makes them inconspicuous and easily overlooked. It was interesting to note that both species were only recorded in areas of least disturbance, i.e. the Narayani islands and Sections III and IV of the Rapti.

EURASIAN THICK KNEE (STONE PLOVER) Burhinus oedicnemus

Small numbers were flushed from stony river banks; a pair near Dumaria Creek (7/11), 3 near the Binai Confluence (19/12) and a single near Dadreni (22/12).

GREAT THICK KNEE (GREAT STONE PLOVER) Esacus magnirostris

RAPTI RIVER A small group of 3 (21/11) and a single (28/11) were recorded on stony beds near Dumaria.

NARAYANI RIVER	Section I		Section II		Section III		Section IV		Section V		Section VI		TOTAL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Visit	-	0	0	0	-	7	-	3	12	4	1	-	13	14
Sightings/visit/km		0		0		0.7		0.4		0.4		0.1		

This species clearly favoured the undisturbed stony banks prevalent along the island margins of the Narayani River. Pairs and small groups of up to 6 birds were recorded resting on the extensive sandy/stony banks (6 below the Gharial Project Camp on 25/11).

FRATINCOLES (GLAREOLIDAE)

SMALL FRATINCOLE Glareola lactea

RAPTI RIVER	Section I		Section II		Section III		Section IV		Section V		Section VI		Section VII		Section VIII		TOTAL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Visit	300+	0	300+	15	1	0	0	0	0	0	1	0	28	212	116	361	746	588
Sightings/visit/km		27.3		46.3		0.1		0		0		0.1		9.5		32.7		

NARAYANI RIVER	Section I		Section II		Section III		Section IV		Section V		Section VI		TOTAL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Visit	-	3	0	6	-	20	-	0	22	21	0	-	22	50
Sightings/visit/km		0.3		0.4		2.1		0		1.0		0		

The crepuscular habits and cryptic features of this resident species made it very inconspicuous and the above figures should be treated as an underestimate, which could have been considerable (a huge flock of c 2000 birds was reported near Meghauli (5/1/83)). The relative abundance and distribution however was considered to be accurate with outstanding concentrations on the Rapti River at Sauraha (two flocks of 300+ on 17/11) and Meghauli (a total of 573 on 26/12, including flocks of 190 and 140). There is thus evidence of local movement. Parties hawking insects were regularly observed along the length/

length of the Narayani at dusk and a surprisingly low peak count of 22 was noted at the Gharial Camp throughout the survey period. This would suggest a richer food supply on the Rapti, the birds resting up on the extensive pebbly islands during the day.

GULLS AND TERNS (LARIDAE)

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		7	1	9	3	3	5	1	6	7	4	6	0	22	12	4	2	59	33
Sightings/ visit/km		0.7		1.8		0.7		0.5		1.4		0.7		1.3		0.4			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		-	0	0	1	-	10	-	13	19	70	5	-	24	94
Sightings/ visit/km		0		0.1		1.1		1.9		2.0		0.3			

Migratory Gulls and resident Terns were widely distributed, singles, pairs and small parties patrolling the rivers or resting on sandbanks. There was evidence of local and migratory movements.

GREAT BLACK-HEADED GULL *Larus ichthyaetus*

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		5	0	6	0	1	0	0	0	1	2	2	0	12+	4	2	0	29	6
Sightings/ visit/km		0.5		0.9		0.1		0		0.4		0.2		0.6		0.1			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		-	0	0	0	-	6	-	4	6	30	0	-	6	40
Sightings/ visit/km		0		0		0.6		0.6		0.8		0			

Singles and small parties (6 at Sauraha 17/11) of this migratory Gull were widely distributed along both rivers. Scavenging parties were often associated with fishing flocks of Large Cormorants, which would explain the local movement, with a notable 20 near the Gharial Camp (26/12) and 12 at Meghauri (3/12).

BLACK-HEADED GULL *Larus ridibundus*

Singles and parties of 2 to 4 birds were recorded occasionally on both rivers; Rapti: a single upriver from Sauraha (17/11 and 18/11), a pair at Sauraha (21/11), a pair at Ghatgai (1/12) and 4 with the Cormorants and Great Black-headed Gulls at Meghauri (3/12); Narayani: 3 below the Gharial Camp (20/12) and a single near the Rapti Confluence (22/12). There were no records on the Rapti during the second visit, suggesting a local or migratory movement.

BROWN-HEADED/

BROWN-HEADED GULL Larus brunnicephalus

Like L. ridibundus this is a relatively scarce winter visitor and there was only one record of a single bird at Kasara (30/11).

INDIAN RIVER TERN Sterna aurantia

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Sightings	1	0	1	0	0	5	0	3	0	1	0	0	0	7	0	0	2	16
	Sightings/ visit/km	0.1		0.1		0.4		0.2		0.1		0		0.3		0			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Sightings	-	0	0	1	-	2	-	2	0	12	0	-	0	17
	Sightings/ visit/km	0		0.1		0.2		0.3		0.3		0			

Singles and parties of 2 to 6 birds (6 resting with 4 Black-bellied Terns S. acuticauda on a sandbank downstream from the Gharial Camp (19/12)) were noted patrolling the rivers and resting on sandbanks. The scarcity of sightings in November would suggest some local movement of this resident species.

BLACK-BELLIED TERN Sterna acuticauda

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Sightings	0	1	0	3	0	0	1	3	5	1	4	0	6	1	2	2	18	11
	Sightings/ visit/km	0.1		0.4		0		0.3		0.7		0.5		0.3		0.3			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Sightings	-	0	0	0	-	2	-	6	13	25	5	-	18	33
	Sightings/ visit/km	0		0		0.2		0.9		0.8		0.3			

Sightings, usually of singles or pairs, were widely distributed, the birds patrolling the rivers or resting on sandbanks (5 near Binai Confluence 24/11, and 5 near Dhruva 3/12). There was evidence of local movement of this relatively common resident Tern.

KINGFISHERS (ALCEDINIDAE)

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Sightings	5	4	12	3	29	16	2	6	5	6	6	6	5	8	0	3	64	52
	Sightings/ visit/km	0.8		2.2		3.9		0.6		1.4		1.4		0.5		0.2			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Sightings	-	4	5	5	-	3	-	6	10	24	3	-	18	42
	Sightings/ visit/km	0.4		0.6		0.3		0.9		0.8		0.2			

This/

This group of resident species was widely scattered and singles were regularly recorded along the lengths of both rivers. Kingfishers were most evident where there were steep banks providing nest sites, overhanging trees providing cover and perches, undisturbed conditions and shallow slow-flowing water, and thus the higher density and diversity along the forested section of the Rapti.

LARGE PIED KINGFISHER Ceryle lugubris

Two singles were recorded along the forested section of the Rapti near Dumaria (21/11).

SMALL PIED KINGFISHER Ceryle rudis

RAPTI RIVER	Section		I		II		III		IV		V		VI		VII		VIII		TOTAL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Visit	4	2	9	2	23	11	1	4	2	2	3	5	2	4	0	3	44	33		
Sightings																				
Sightings/visit/km			0.5		1.6		3.0		0.4		0.5		0.9		0.2		0.2			

NARAYANI RIVER	Section		I		II		III		IV		V		VI		TOTAL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Visit	-	0	2	4	-	3	-	6	8	16	0	-	10	29		
Sightings																
Sightings/visit/km			0		0.4		0.3		0.9		0.5		0			

This was the most abundant Kingfisher. Sightings, usually of single hunting birds, were widely distributed along the rivers with a particularly high density along the forested section of the Rapti.

EURASIAN KINGFISHER Alcedo atthis

RAPTI RIVER	Section		I		II		III		IV		V		VI		VII		VIII		TOTAL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Visit	1	1	0	0	1	0	1	1	1	2	1	0	1	3	0	0	6	7		
Sightings																				
Sightings/visit/km			0.2		0		0.1		0.2		0.4		0.1		0.2		0			

NARAYANI RIVER	Section		I		II		III		IV		V		VI		TOTAL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Visit	-	0	3	0	-	0	-	0	2	7	2	-	7	7		
Sightings																
Sightings/visit/km			0		0.2		0		0		0.2		0.1			

Single birds were regularly distributed along most sections of the rivers throughout the period.

STORK-BILLED KINGFISHER Pelargopsis capensis

Two singles were recorded along the Rapti near Kasara and opposite Dumaria Creek (28/12).

WHITE-BREADED/

WHITE-BREASTED KINGFISHER Halcyon smyrnensis

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		0	1	3	1	3	4	0	1	2	1	2	1	2	1	0	0	12	10
Sightings/ visit/km		0.1		0.6		0.6		0.1		0.4		0.3		0.1		0			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		-	4	0	1	-	0	-	0	0	1	1	-	1	6
Sightings/ visit/km		0.4		0.1		0		0		0.1		0.1			

Single birds were widely scattered along the lengths of both rivers throughout the survey.

THRUSHES, CHATS, etc. (TURDIDAE)

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Sightings/ visit/km		0		0		0.1		0		0		0		0		0			

NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		-	0	2	3	-	0	-	0	0	2	9	-	11	5
Sightings/ visit/km		0		0.3		0		0		0.1		0.5			

This family was represented by three species typically associated with boulders and fast flowing water, features which were prevalent near the Binai Confluence where the Narayani enters a steep forested gorge. The importance of bankside vegetation was emphasized in this group.

WHITE-CAPPED RIVER CHAT Chaimarrornis leucocephalus

Two pairs (24/11) and two singles (24/11 and 19/12) were recorded near Binai Confluence.

PLUMBEOUS REDSTART Rhyacornis fuliginosus

Three (24/11) and a single (19/12) were recorded near Binai Confluence and 2 (28/11) and three singles (24/12) were noted along the fringes of the wooded islands downstream from Lokhani. A single bird was recorded along the forested section of the Rapti. Besides boulders in running water this species associates with wooded banks where there is a rich food supply of fruit and insects.

BLUE ROCK THRUSH Monticola solitarius

A single (male) was recorded at Binai Confluence (24/11).

## WALLCREEPER/

**WALLCREEPER Tichodroma muraria**

The Wallcreeper is a bird associated with cliffs and boulders in rivers, features which were exclusive to Section VI of the Narayani. Six singles were recorded between Binai Confluence and Tribeni (24/11).

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### VIII EFFECTS OF FOREST CLEARANCE

To illustrate some of the effects of forest clearance for cultivation and associated increase in human disturbance on the distribution of riverain bird populations several sections were chosen on each river. Adjacent land use and degree of disturbance varied in each case. (TABLE 3)

#### RAPTI RIVER (DECEMBER)

Section	III Budi Rapti to Dumaria			IV Dumaria to Ghatgai			VII Dhruba to Meghauli		
	North Bank	South Bank and Islands	Total	North Bank	South Bank and Islands	Total	North Bank	South Bank and Islands	Total
Adjacent Land Use	Forest	Grassland		Marginal Forest	Grassland/Riverain Forest		Culti-Grass- vation land/ Riverain Forest		
Degree of Disturbance	Low	Low		Medium	Low		High	Low	
Bird Population (% Total)	296(67%)	148(33%)	444	138(29%)	340(71%)	478	290 (27%)	776 (73%)	1066
Population/km	51.9	26.0	77.9	21.6	53.1	74.7	23.0	61.6	84.6
Diversity (No. of Spp)	27	19	31	22	27	30	24	26	32

#### NARAYANI RIVER (DECEMBER)

Section	I Kitauli to Lokhani			I Kitauli to Lokhani	III Kitauli to Dadreni Check Post
Division	Main Bank	Islands	Total	Main Bank/Islands	Islands
Adjacent Land Use	Culti- vation	Grassland/ Riverain Forest		Forest/Grassland/ Riverain Forest	Grassland
Degree of Disturbance	High	Low		Low	Low
Bird Population (% Total)	36 (3%)	1088 (97%)	1124	1003	2465
Population/km	4.7	141.3	146	238.8	259.5
Diversity (No. of Spp)	4	21	21	16	28

TABLE 3: Bird Populations and Diversities in 6 Habitat Divisions

#### RAPTI RIVER

It was interesting to note that despite a marked difference in adjacent land use and degree of human disturbance in these 3 sections of the Rapti River, bird population densities and diversities were quite similar. However the results clearly illustrate the/



the effects of disturbance on the bird distribution within each section. In section III where disturbance was negligible, the north bank supported 67% of the population and 27 of the 31 species recorded in that section. In sections IV and VII where disturbance was relatively low and high respectively, the south bank and islands supported over 70% of the population and a higher number of species, despite the availability of suitable resting and feeding areas on the north bank of the river. Thus where there is disturbance along the north bank the majority of birds in that section rely on the security of the islands and National Park side of the river. It should be noted that there was little variation in abundance and local distribution between the two visits to these three sections.

#### NARAYANI RIVER

Similarly the results for the Narayani clearly illustrate a marked effect of bank disturbance on the local distribution of bird populations. Along the cultivated section downstream from Kitauli (Section I) the island fringes supported 97% of the population. (It was also interesting to compare a similar cultivated section downstream from Lokhani Check Post which supported a population of 1719, 93% of which were on the island banks.) Only 4 species were recorded on the cultivated bank. The undisturbed sections downstream from Kitauli, the forested and island sections, section III in particular which fell almost entirely within the boundaries of the National Park, supported higher population densities and diversities.

The comparatively higher population density and lower diversity on the Narayani reflects the large concentrations of ducks, Ruddy Shelduck in particular, along this largely undisturbed river. The results for both rivers clearly illustrate the importance of the National Park as a refuge for these important populations of resident and migratory birds.

IX AREAS OF PARTICULAR ORNITHOLOGICAL INTERESTRAPTI RIVER1) SAURAHA TO PAPARIYA (Section I)

This section was particularly interesting during the first half of the survey, especially at the beginning of December when there was a marked fall in water level. The sandy islands and shallows which became evident in the middle of the river provided feeding and resting areas for an outstanding concentration of Ducks. 573 Ruddy Shelducks, the highest concentration on the Rapti, 43 Goosanders, 36 Gadwall, 34 Wigeon, 10 Mallard and 4 Spotbill (the only record of this species) were recorded there on 7 December. A single Eurasian Shelduck, a scarce migrant, was present from 17 November till 7 December. The extensive sandy/pebbly banks on the north side of the river provided secure resting sites for large flocks of Large Cormorants (350 on 18/11) and Small Pratincoles (300+ on 17/11). Bar-headed Goose (4), Curlew Sandpiper (3) and Avocet (7) were recorded on passage on 9 November. There was an exodus of Large Cormorants, Small Pratincoles and Ducks from this area in December.

2) DUMARIA (Section III)

The extensive silt deposits on the north bank opposite Dumaria Creek provided secure feeding areas for migratory waders and supported a relatively high population throughout the survey period, notably Temminck's Stint (45+ on 5/12), and scarce winter visitors, Dunlin (8 on 5/12 and 22 on 28/12), Little Stint (3 on 28/12), Spotted Redshank (2 on 28/12) and Wood Sandpiper (1 on 28/12). Bankside trees provided roosting sites for Large Cormorants (234 on 21/11). Other notable records from this area were a pair of Eurasian Thick Knees (7/11), the only record of this species on the Rapti, 3 Great Thick Knees (21/11) - both species associated with the stony banks in the area - and two sightings of Large Pied Kingfisher (21/11), the only survey records of this scarce species. Himalayan Gray-headed Fishing Eagle and Stork-billed Kingfisher were recorded in the vicinity of Dumaria Creek (16/12) and an Osprey regularly fished there. The high species diversity of the area reflected the undisturbed habitat.

3) JARNALI (Section IV)

The extensive sand/mud banks, islands and shallow channels opposite Jarnali (upstream from Ghatgai) supported outstanding concentrations of feeding and roosting waders throughout the survey period, notably 30 Kentish Plovers (4/12), 102 Green-shanks (4/12) and 60+ Temminck's Stints (28/12). A variety of scarce migratory waders were recorded there; a single Eastern Golden Plover (4/12), a single Spotted Redshank (28/12), 4 Wood Sandpipers (28/12), 4 Little Stints (28/12), 5 Dunlin (1/12) and 3 Curlew Sandpipers (1/12). The area was also of particular interest during the first/

first visit for roosting congregations of Egrets; 92 Little Egrets (21/11) and 43 Intermediate Egrets (4/12). A roosting flock of 20 Black Ibis was noted there (4/12).

NARAYANI RIVER

1) ISLANDS DOWNSTREAM FROM LOKHANI (Section II)

The island fringes downstream from Lokhani were of outstanding importance for migratory ducks and Ruddy Shelduck in particular. Outstanding concentrations of feeding and loafing ducks were recorded along a 3.5 km stretch of river during both visits. There was clearly a build-up in the wintering population in December.

SPECIES	POPULATION		DENSITY (POPULATION/KM)	
	Visit A (28/11)	Visit B (24/12)	Visit A	Visit B
Ruddy Shelduck	980	1238	280.0	353.7
Pintail	5	68	1.4	19.4
Common Teal	30	80	8.6	22.9
Mallard	20	26	5.7	7.4
Gadwall	13	53	3.7	15.1
Eurasian Wigeon	8	26	2.3	7.4
Red-crested Pochard	0	3	0	0.9
Total	1056	1494	301.7	426.8

A rich food supply in the form of green algae and freedom from disturbance promoted these dense concentrations. Other interesting records for this area were a single Darter (28/11) and a flock of 30 Bar-headed Geese (24/12).

2) BINAI CONFLUENCE TO TRIBENI (Section VI)

This section was of special interest for riverain species which associated with cliffs and boulders, features prevalent and unique to this area. White-capped River Chats (5), Plumbeous Redstarts (3), a single Blue Rock Thrush and Wallcreepers (5) were recorded (24/11) during the single visit. All except Plumbeous Redstart were unique to this area.

It was interesting to note that all these areas of outstanding ornithological interest occurred where the riverain habitat remained largely intact and bankside disturbance was minimal.

X DISCUSSION

The Narayani River was of outstanding importance for migratory ducks supporting 87% of the area's wintering population, the majority (83%) of which were Ruddy Shelduck. The Rapti on the other hand was of particular interest for resident and migratory waders (Charadriidae and Scolopacidae) supporting 73% of the riverain wader population of which Greenshank, Temminck's Stint, Kentish Plover and Little Ring Plover (which probably breeds in the area) were predominant, but which also included scarce winter visitors. Small Pratincole was another important resident species which clearly favoured the Rapti River. Large Cormorants were recorded in large numbers on both rivers, although there was probably a local movement from the Rapti to the Narayani in December. Together Ducks (74%), Waders (11%), Cormorants (5%) and Pratincoles (4%) made up 94% of the area's riverain bird population in December. The remainder was comprised of Herons (3%), Black Ibis, Osprey, Avocet, Thick Knees, Gulls and Terns, Kingfishers, Thrushes, Chats and Wallcreeper.

TABLE 4

TOTAL POPULATION : DIVERSITY AND DENSITIES

RAPTI RIVER	Section Visit	I		II		III		IV		V		VI		VII		VIII		TOTAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Sightings		1547	307	557	414	733	444	490	478	363	182	364	280	1112	1074	463	764	5629	3943
Sightings/ visit/km		168.5		142.8		103.2		75.6		68.1		74.9		86.7		84.0		97.3	
Species		36	17	27	18	35	32	25	30	28	26	24	18	30	32	19	21	49	39
Species/ visit/km		4.8		6.6		5.9		4.3		6.7		4.9		2.5		2.7		0.9	
NARAYANI RIVER	Section Visit	I		II		III		IV		V		VI		TOTAL (Estimate)					
Sightings		-	2120	1974	2498	-	2465	-	937	2276	4562	188	-	12,770					
Sightings/ visit/km		194.5		286.7		259.5		133.9		152.0		10.6		169.4					
Species		-	22	33	32	-	28	-	23	30	40	19	-	49					
Species/ visit/km		2.0		4.2		2.9		3.3		1.6		1.1		0.6					

Total population densities were significantly higher on the Narayani but this river supported a lower species diversity. The high densities on the Narayani reflected the outstanding concentrations of Ducks, especially along the island fringes on the upper sections of the river. There was evidence of a build-up in this important wintering population in December. Relatively high population densities were noted at Sauraha on the Rapti River but high numbers of Ducks, Cormorants and Pratincoles left this area in December. The high species diversity on the Rapti reflected the abundance of migratory waders on this river.

Habitat and human disturbance were obviously important factors in determining the diversity, abundance and relative distribution of bird populations using the rivers, their/

their banks and islands.

Shallow conditions and algal growth on mud, sand and stones which provided a rich food supply, attracted large numbers of migratory ducks to the island fringes of the Narayani. There was evidence of greater concentrations along undisturbed stretches of that river. The Narayani islands, which are within the National Park boundary, therefore provide secure feeding and resting areas for an important population of wintering ducks and Ruddy Shelduck in particular. The Great Thick Knee although present in small numbers was attracted to the extensive stony banks typical of the Narayani and may also reflect the undisturbed island habitat. It was also interesting to note that the Gharial Gavialis gangeticus was a good indicator of the degree of human disturbance with regular sightings on the Narayani but like the Great Thick Knee restricted to section III (undisturbed forest section) of the Rapti. Although undisturbed, section VI of the Narayani supported a low population and diversity, a reflection of the dramatic change in the riverain habitat as it narrows and enters a gorge. Sandbanks providing feeding and resting areas were scarce but the boulders and cliffs supported an interesting group of species unique to this area.

Extensive deposits of silt, sand and pebbles, shallow channels and small islands provided ideal conditions for a large and diverse population of resident and migratory riverain species on the Rapti River. Waders and Small Pratincoles were of outstanding importance and Kingfishers and Herons were of local interest. As on the Narayani, highest diversities and greatest concentrations of feeding and resting birds were recorded in those areas where disturbance was minimal, e.g. at Dumaria and Jarneli.

There was evidence of local and migratory movements on both rivers throughout the survey period. Local movement, e.g. of Large Cormorants and Small Pratincoles, between sections within the study area was probably induced by natural ecological factors such as a change in water level and food availability. However, there was evidence on both rivers of forest clearance and the associated increase in human disturbance on the river bank affecting the local distribution of riverain bird populations within sections. Where suitable feeding and resting areas prevailed on both banks of the river but where forest had been cleared on one bank, as was the case over most of the study area, over 70% of the section population occurred on the islands and undisturbed bank.

The Royal Chitwan National Park provides a secure refuge for large numbers of resident and migratory riverain birds. It is important that the riverain habitat remains intact to ensure the preservation of the important bird populations it supports and to provide an alternative feeding and resting area for birds displaced as a result of bankside disturbance.

It is recommended that this study should be continued over a longer time period which would include peak migration periods in autumn and spring. There is evidence that the Rapti and Narayani Rivers support migratory and wintering wader and duck populations of national importance.

#### XI SUMMARY

An ornithological survey of the Rapti and Narayani Rivers along the boundaries of the Royal Chitwan National Park was carried out between 4th November and 29th December 1982. Fifty-seven species were censused in detail and habitat features including human disturbance were noted. The Narayani supported outstanding densities of migratory ducks of which the Ruddy Shelduck was the most abundant. The Rapti was outstanding for resident and migratory waders and Small Pratincoles. Scarce migratory waders were a feature of the Rapti and contributed to a higher species diversity on this river. Local and migratory movements were detected on both rivers throughout the survey period. Distributional patterns along the two rivers and differences between them were closely related to the habitat features noted. Ducks were attracted to the Narayani by a rich food supply which they could utilize in undisturbed conditions along the sandy/stony banks, while waders were attracted to the Rapti by the shallow silty conditions. Effects of forest clearance and associated increase in human disturbance on the local distribution of riverain birds was investigated. The National Park provided secure feeding and resting areas for over 70% of the population when the bank outwith the Park was disturbed. Areas of particular ornithological interest were identified and described.

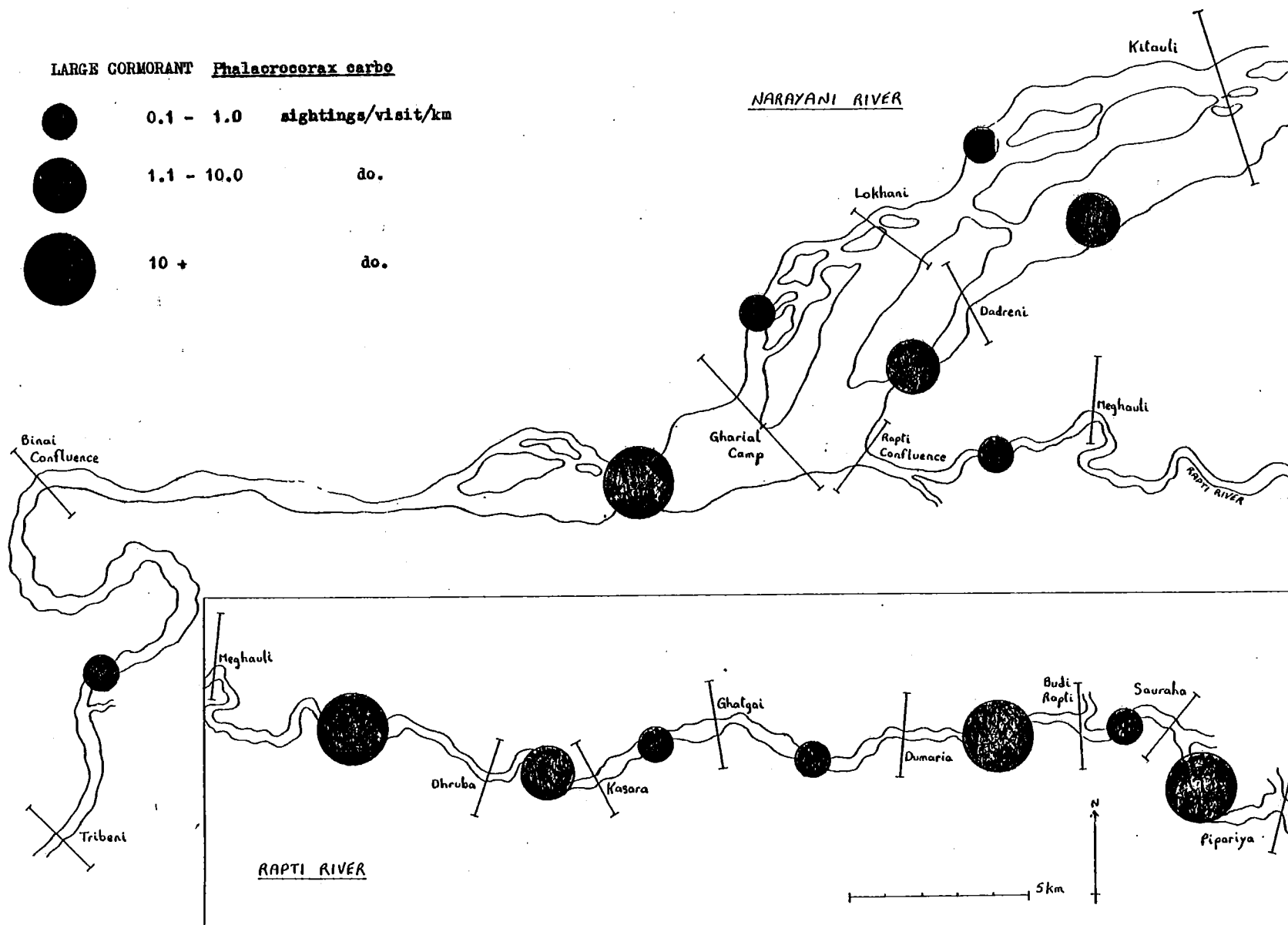
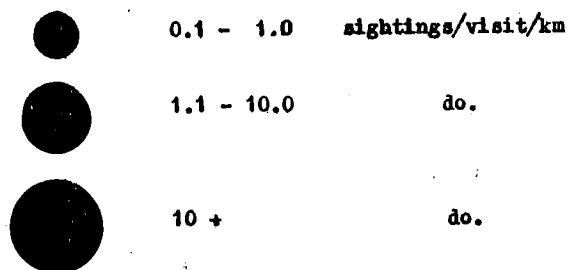
#### XII ACKNOWLEDGMENTS

Thanks are due to Dr Iain Taylor (Department of Forestry and Natural Resources, University of Edinburgh) for proposing the project and providing advise, and to Dr Hermanta Mishra (Wildlife Department, Nepal), Mr Sanat Dhungel (Chief Warden) and Mr R. P. Yadav (Park Warden) for their help in providing information, accommodation and hospitality. I am especially grateful to the Gharial Project Team and Jog Prasad in particular for providing equipment and unrivalled hospitality - without them the project would not have been possible. Thanks also to Mr Matthew Ridley for his assistance in the field. Finally, special thanks are due to my mother who typed the Report.

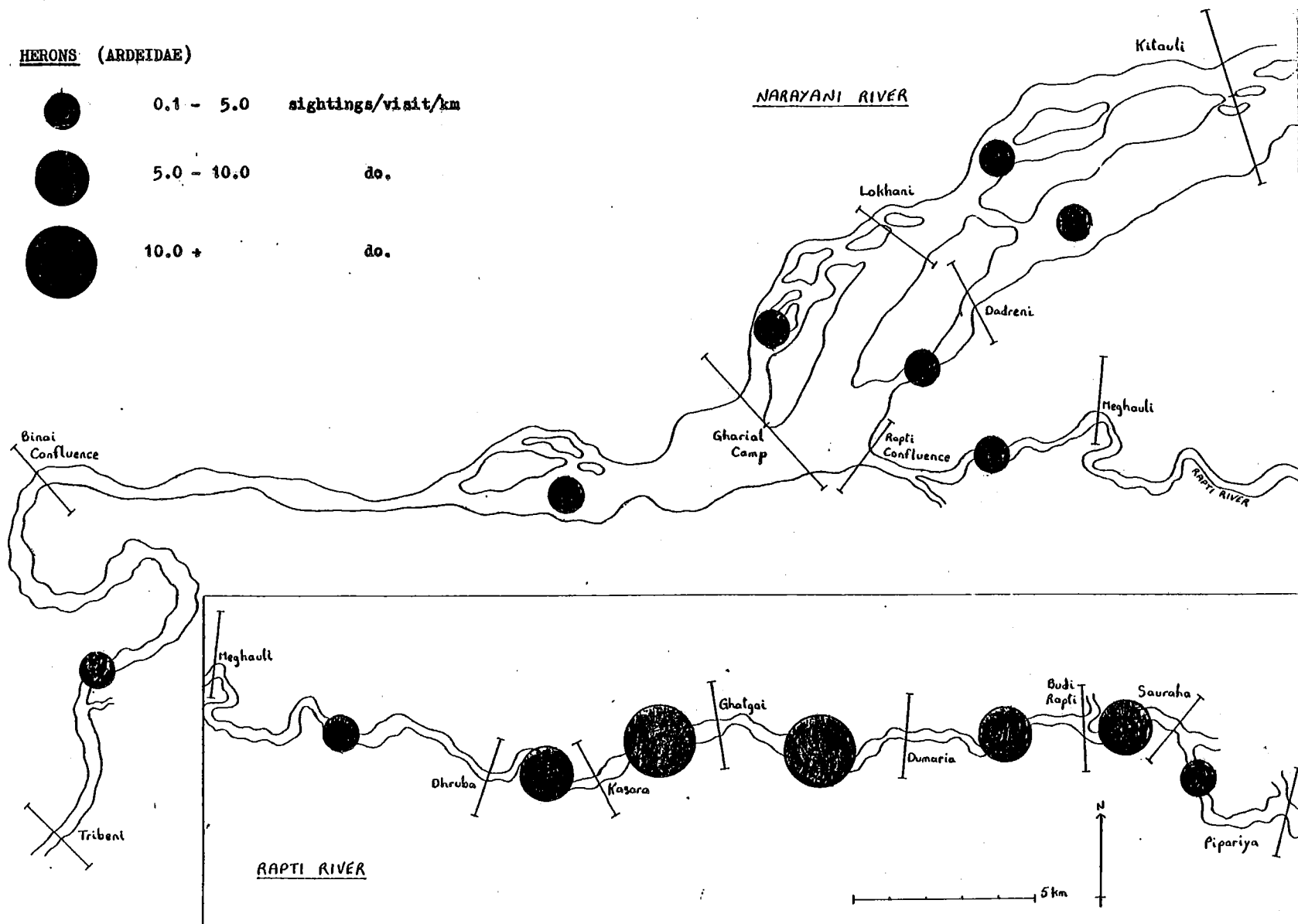
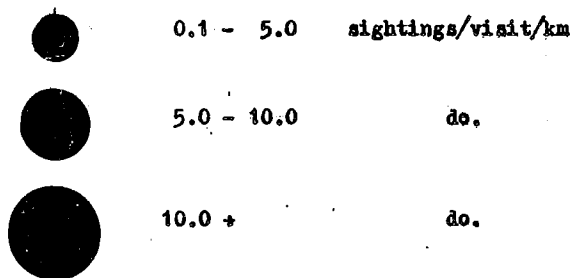
#### XIII FINANCIAL ARRANGEMENTS

The project was entirely self financed.

LARGE GORMORANT Phalacrocorax carbo



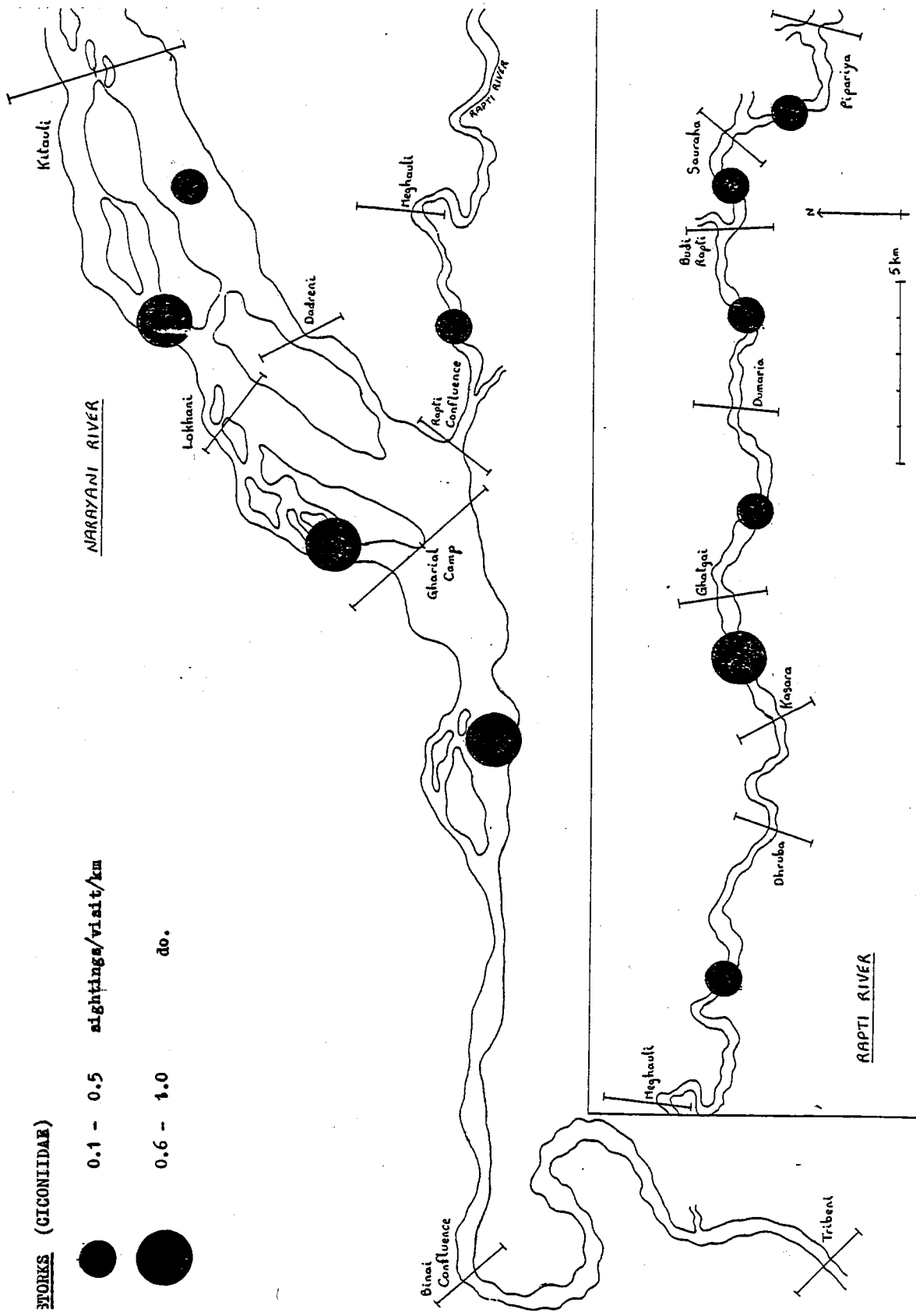
HERONS (ARDEIDAE)



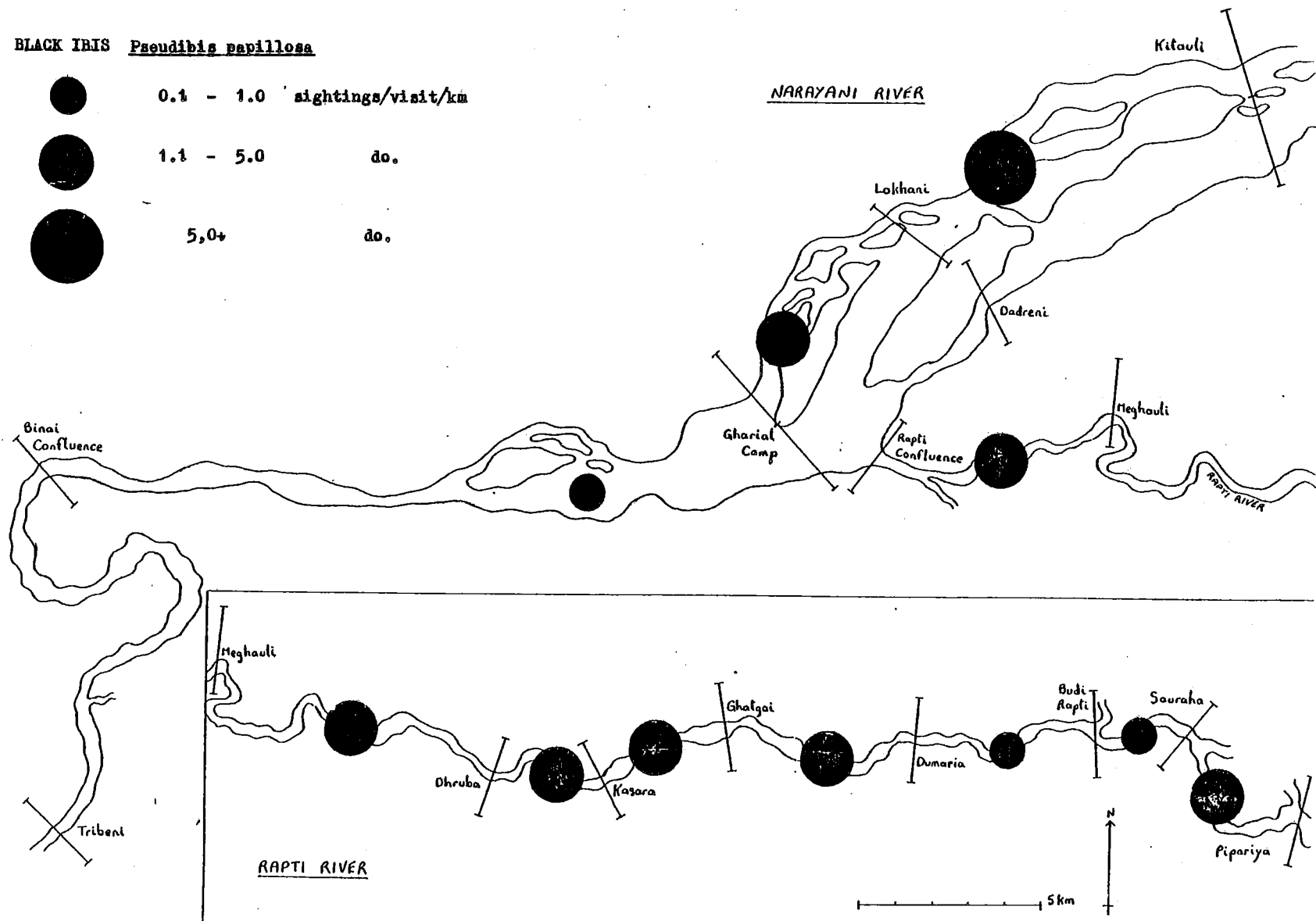
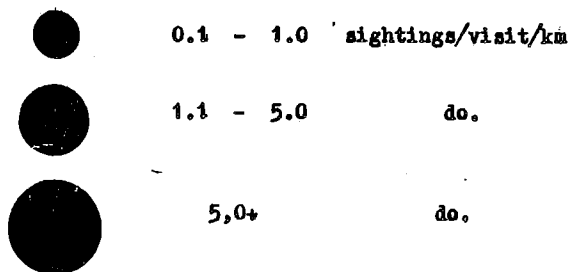


WORKS (GIGONIIDAR)

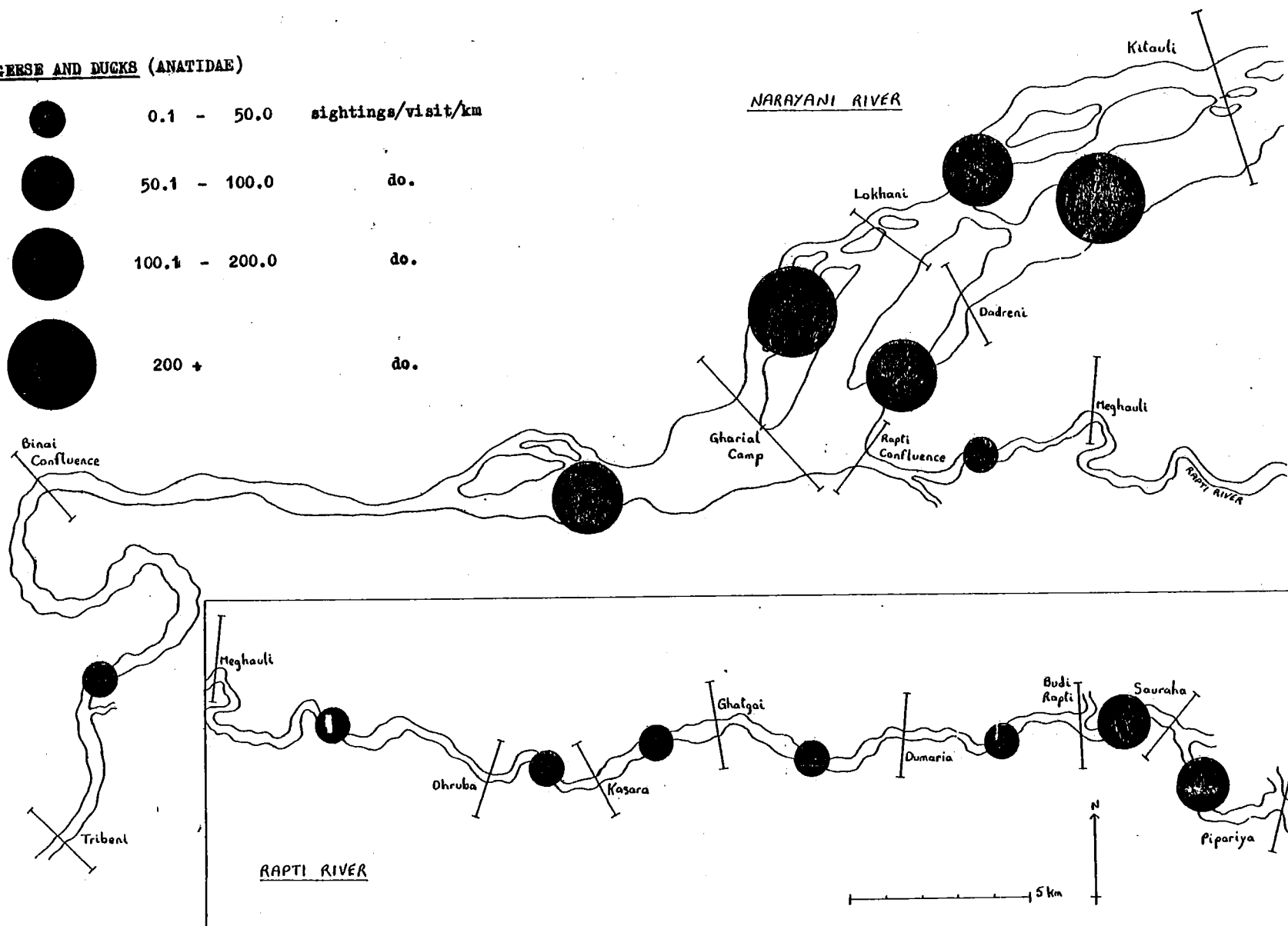
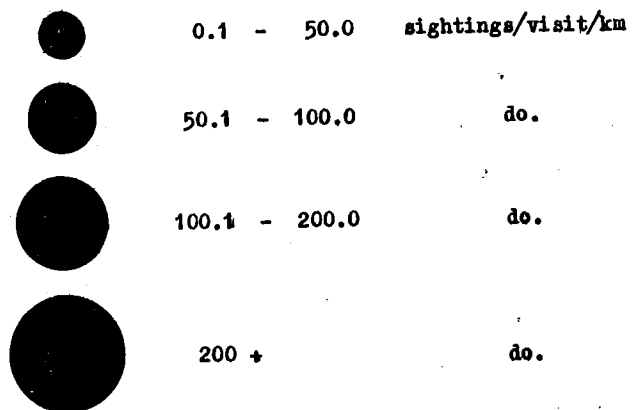
- 0.1 - 0.5 sightings/visit/km
- 0.6 - 1.0 do.
- do.



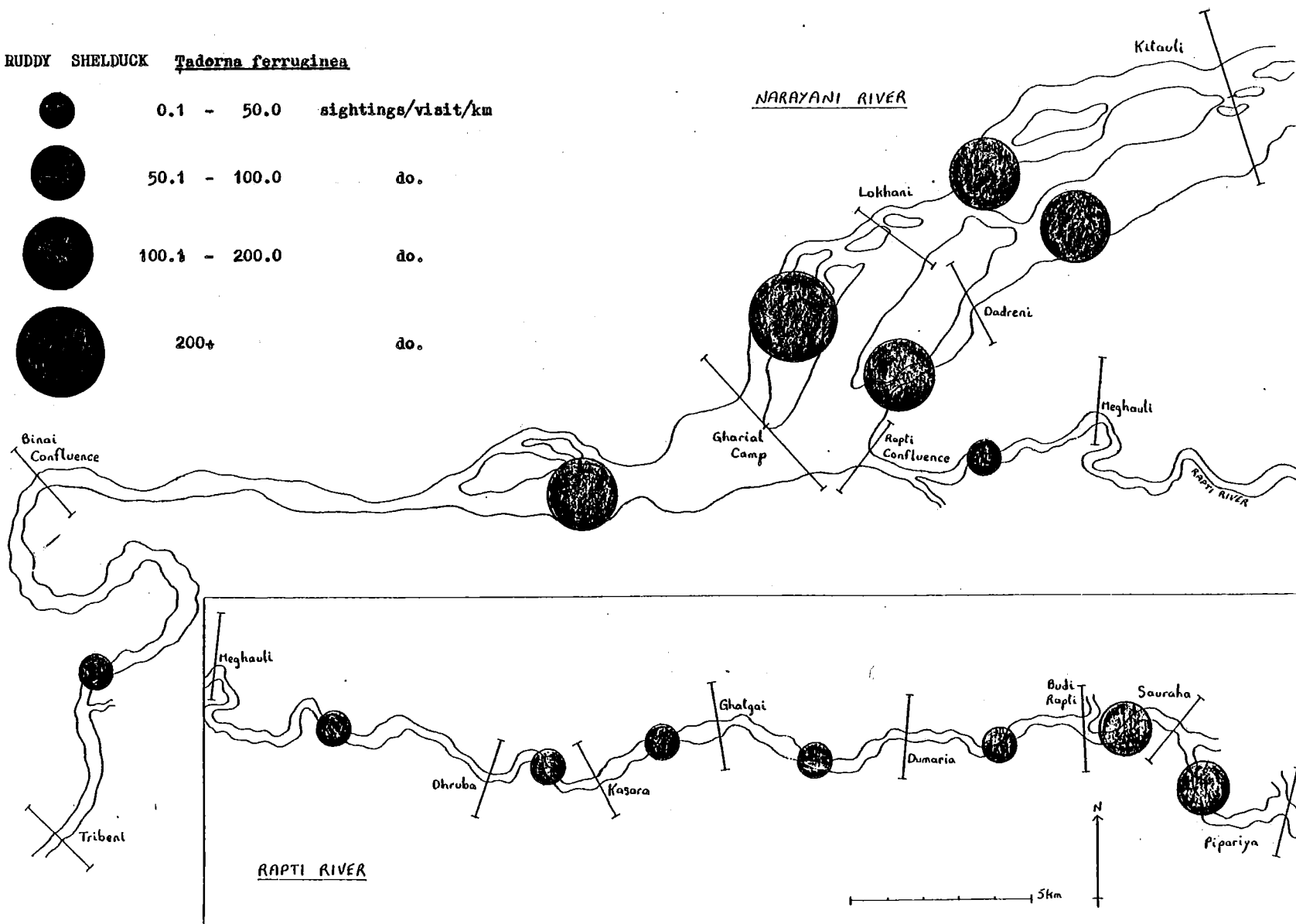
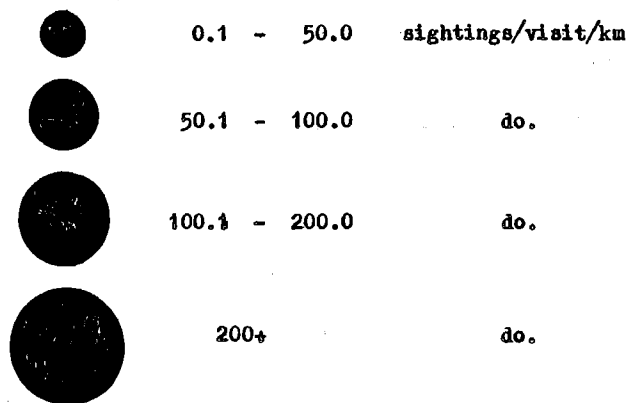
BLACK IBIS *Pseudibis papillosa*



GESE AND DUCKS (ANATIDAE)

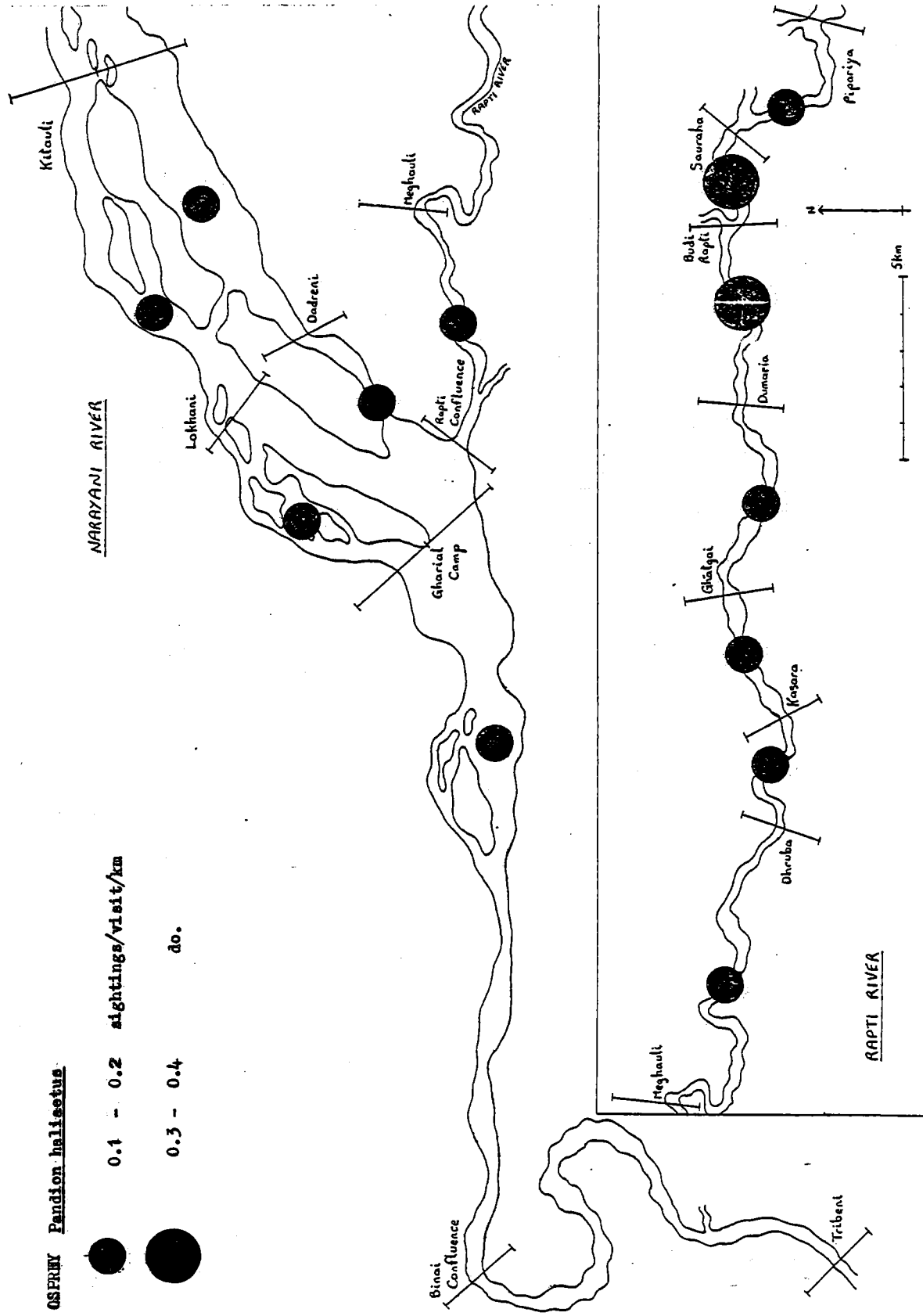


RUDDY SHELDUCK Tadorna ferruginea

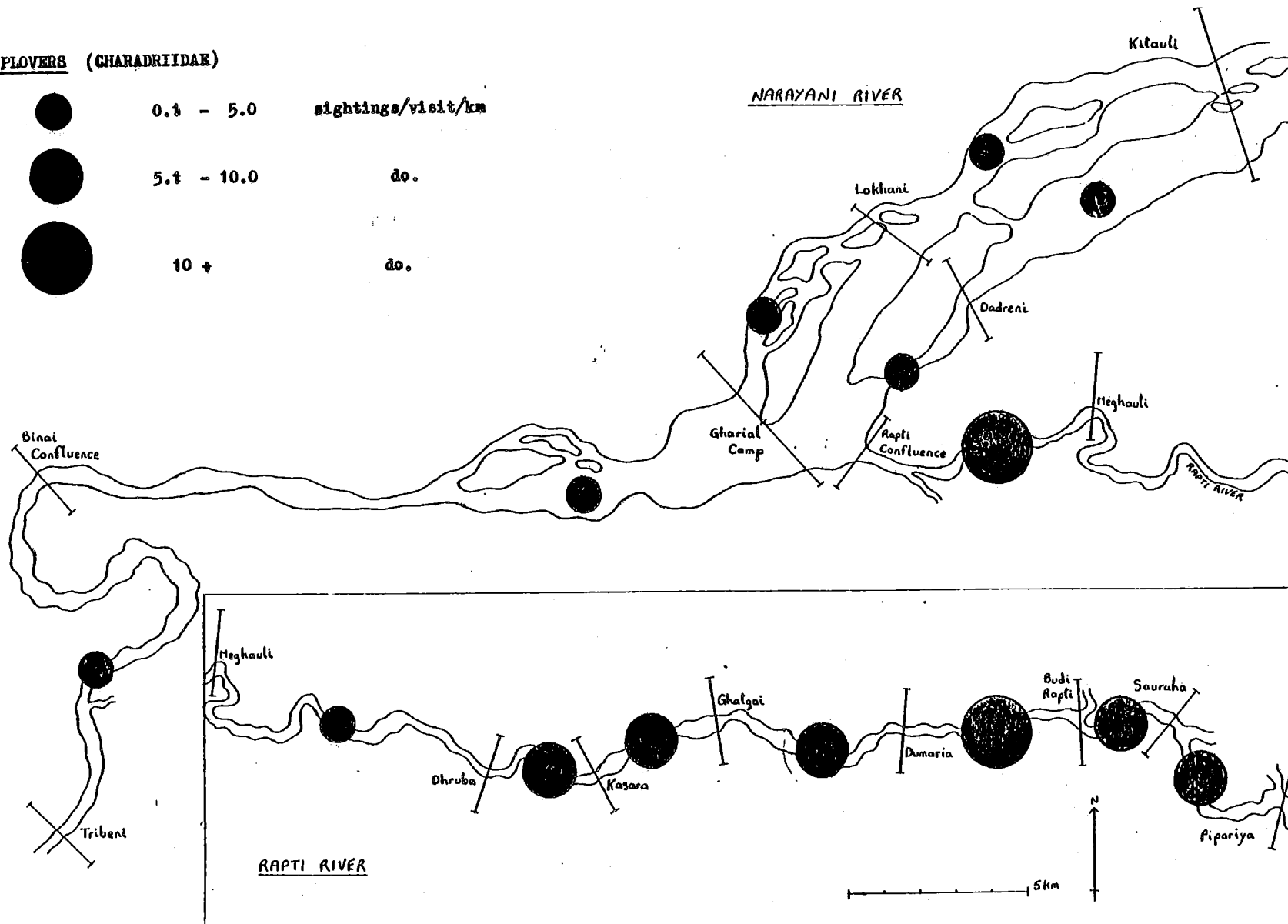
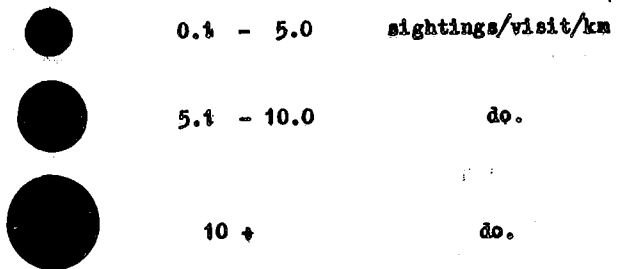


OSPREY *Pandion haliaetus*

- 0.1 - 0.2 sightings/visit/km
- 0.3 - 0.4 do.

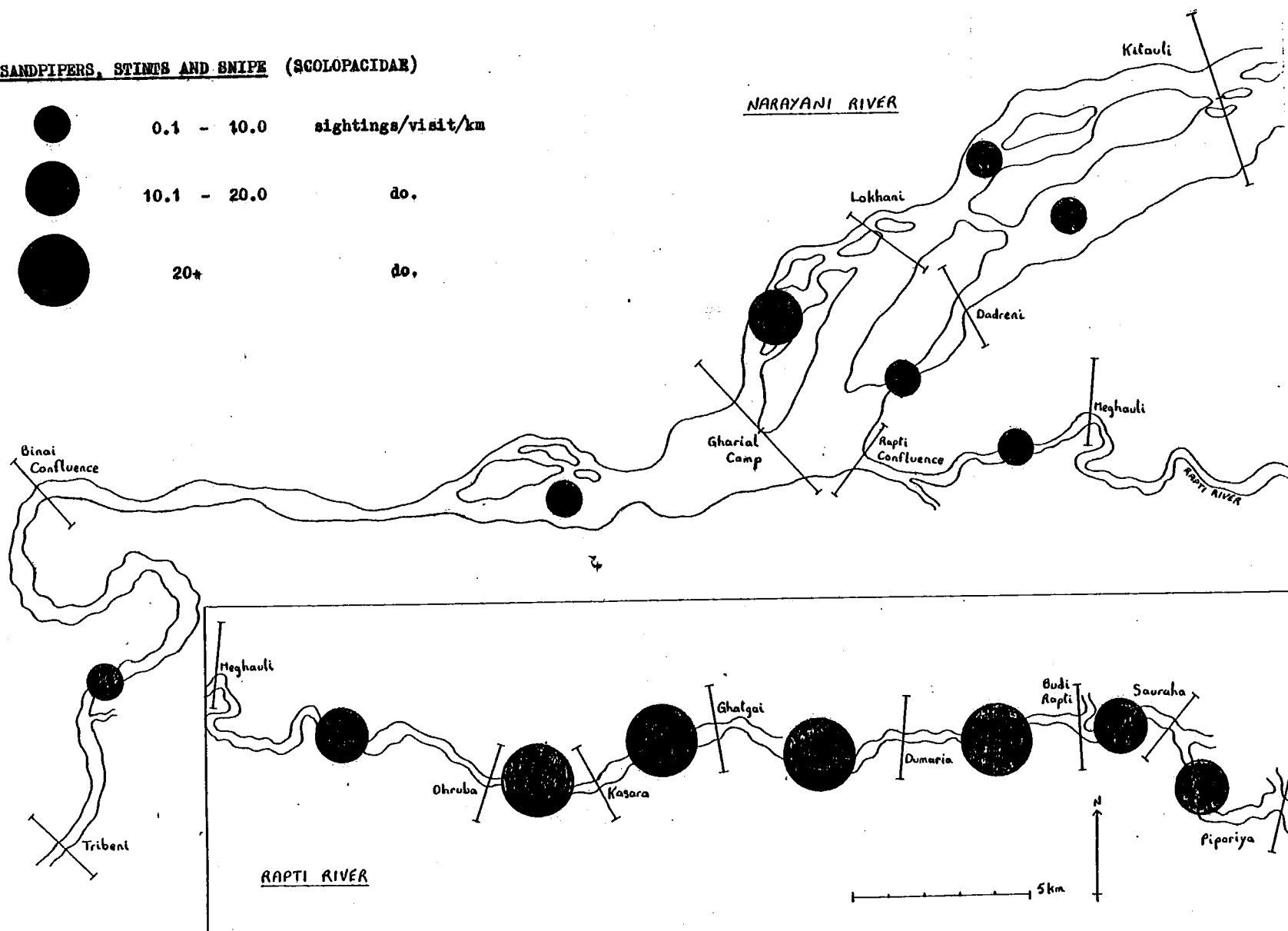


PLOVERS (CHARADRIIDAE)

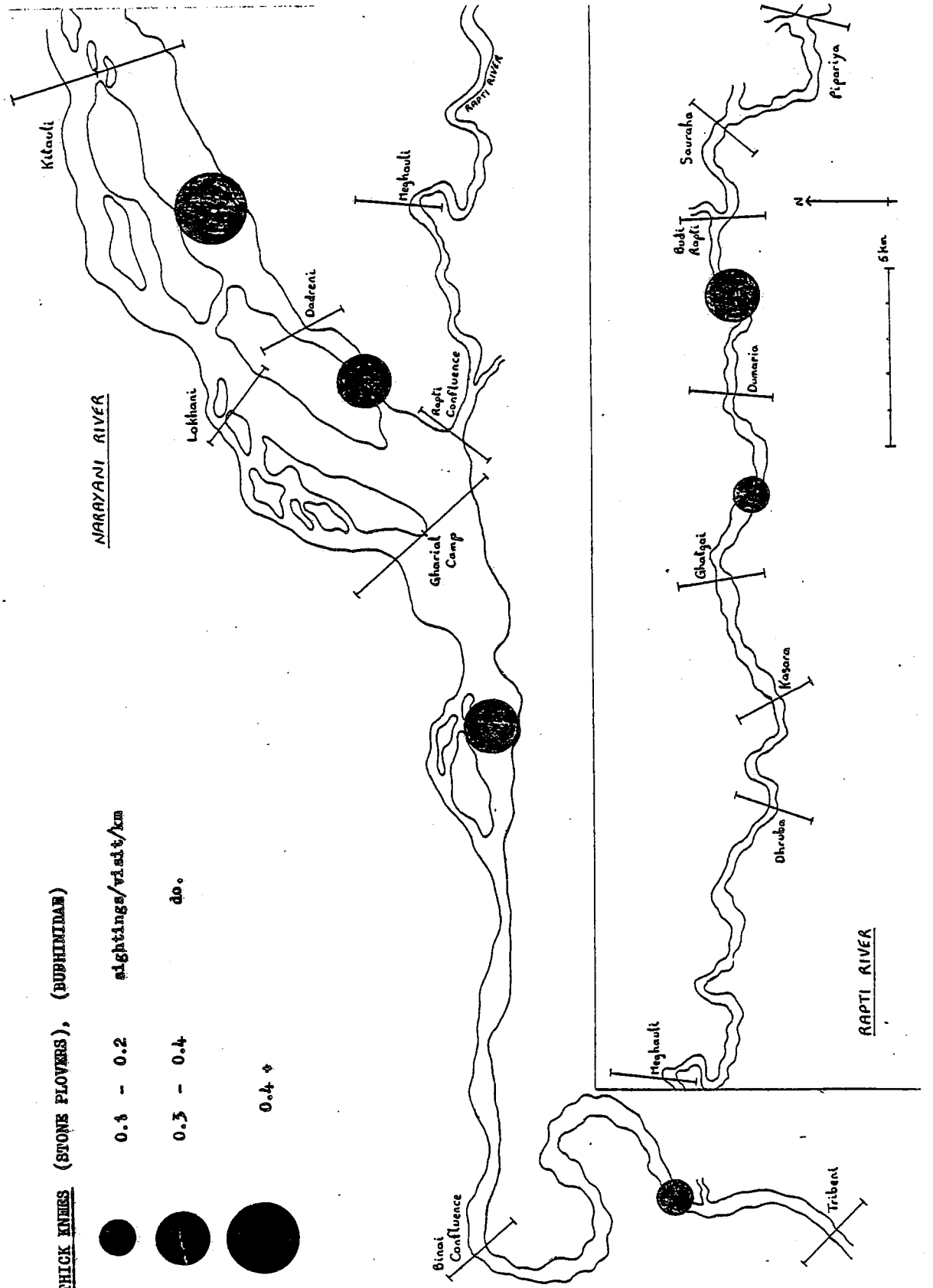
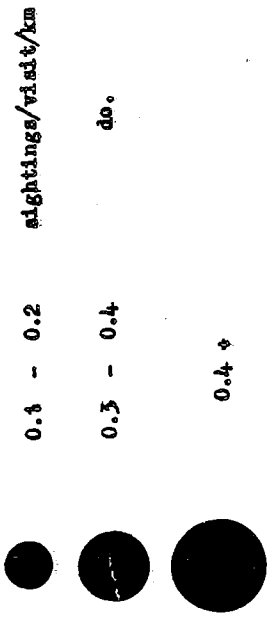


SANDPIPERS, STINTS AND SNIFE (SCOLOPACIDAE)

●	0.1 - 10.0	sightings/visit/km
●	10.1 - 20.0	do.
●	20+	do.

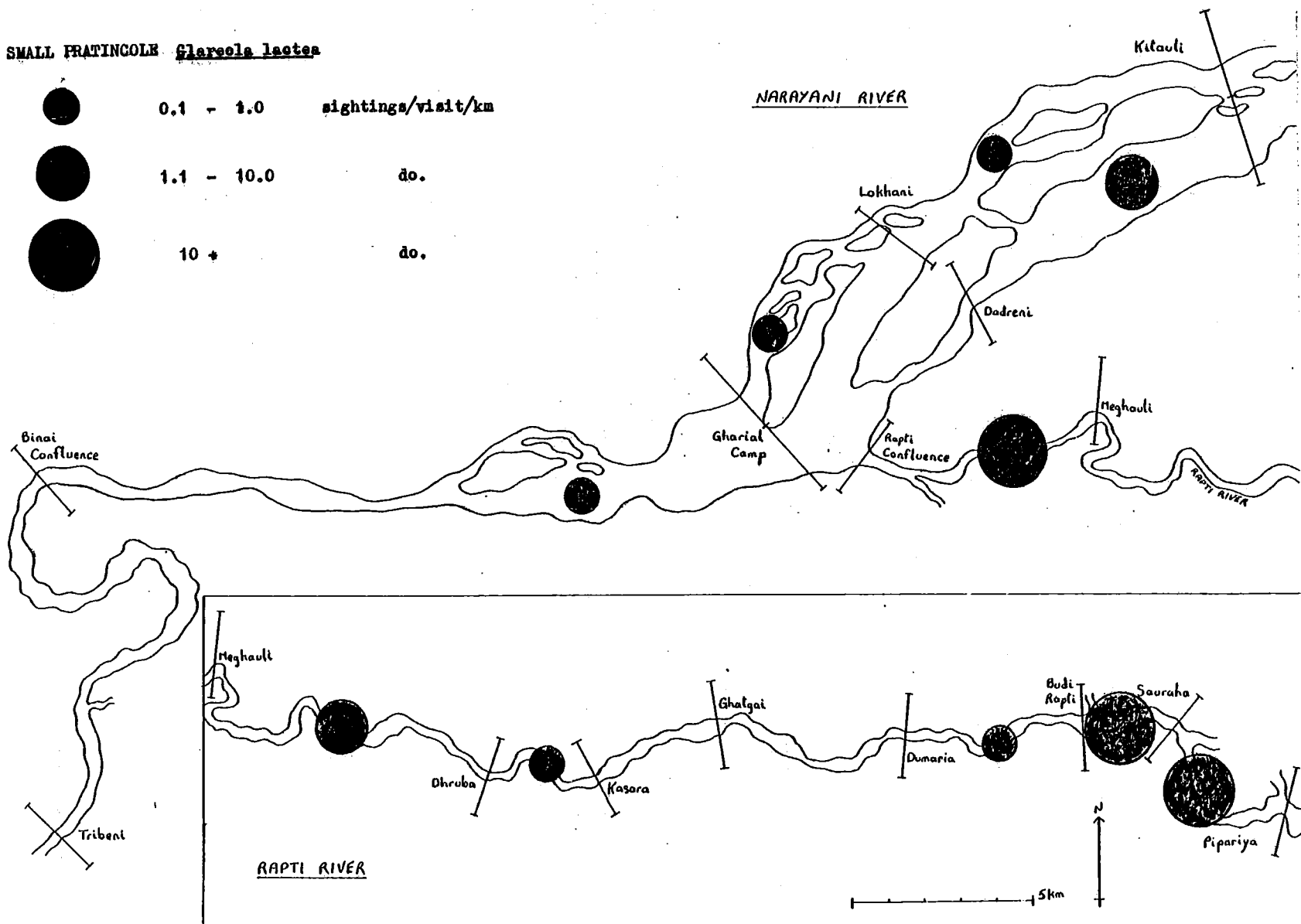
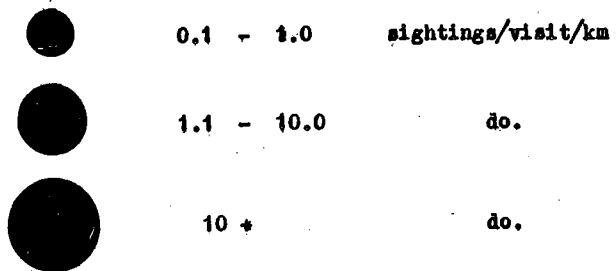


**THICK KNEES (STONE FLOWERS), (RUBINIDAE)**

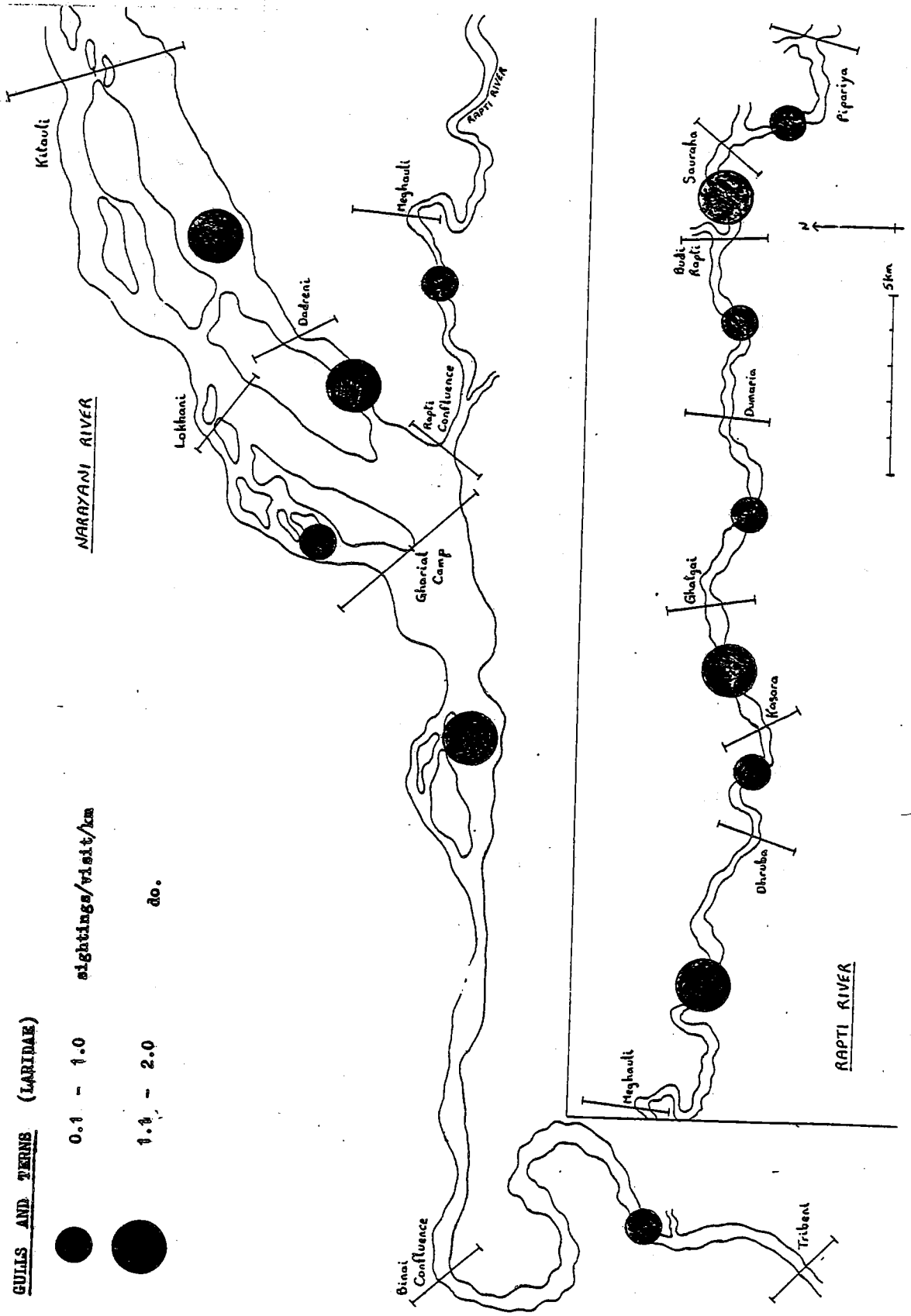
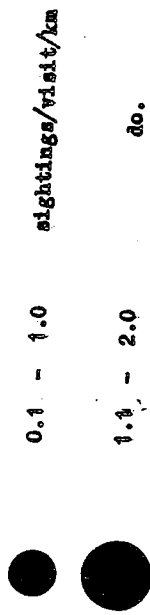




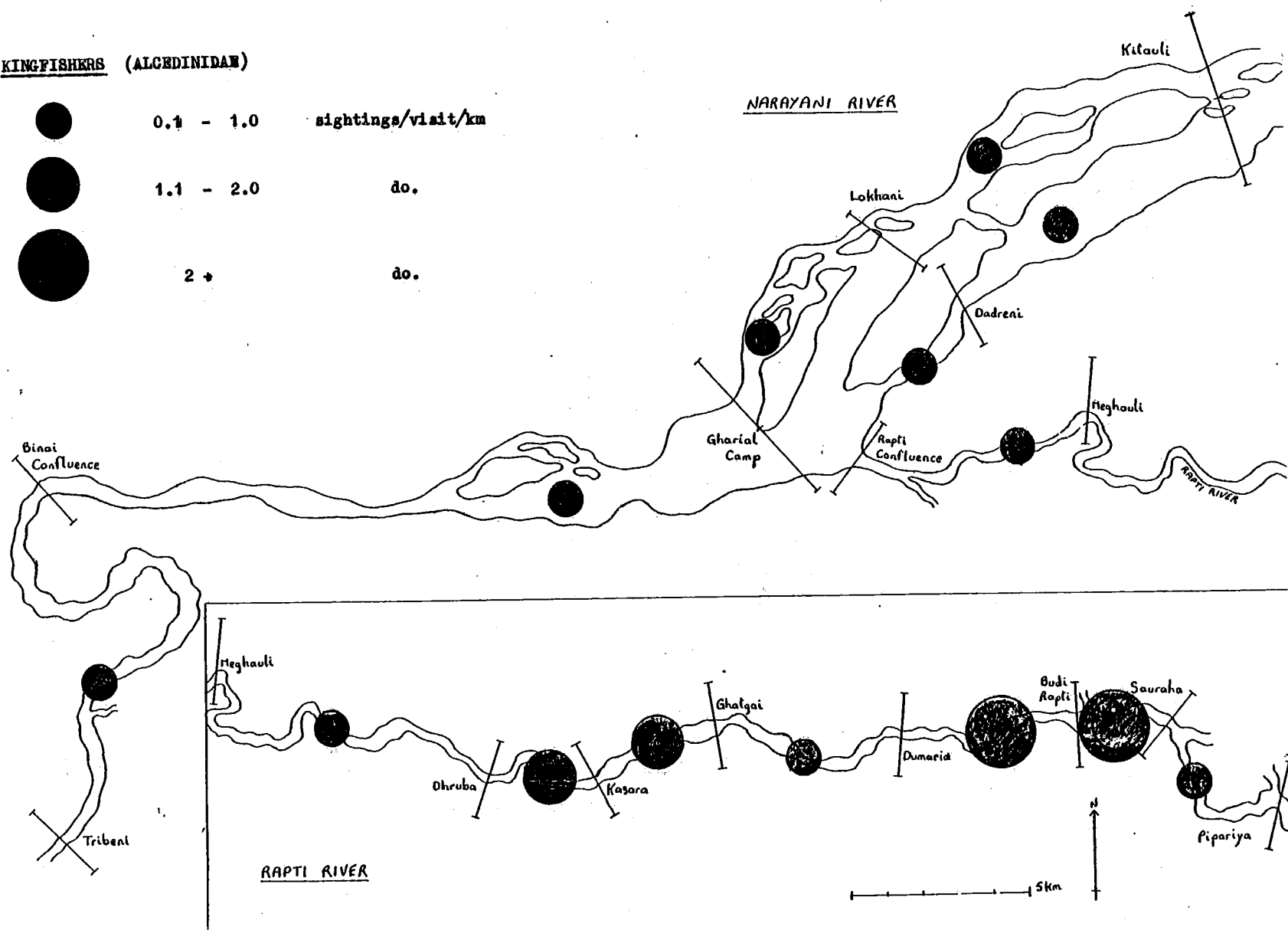
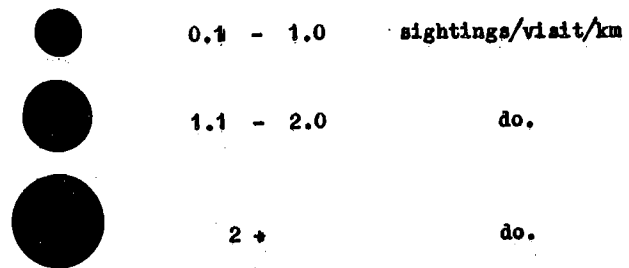
SMALL FRATINCOLE Glareola lactea



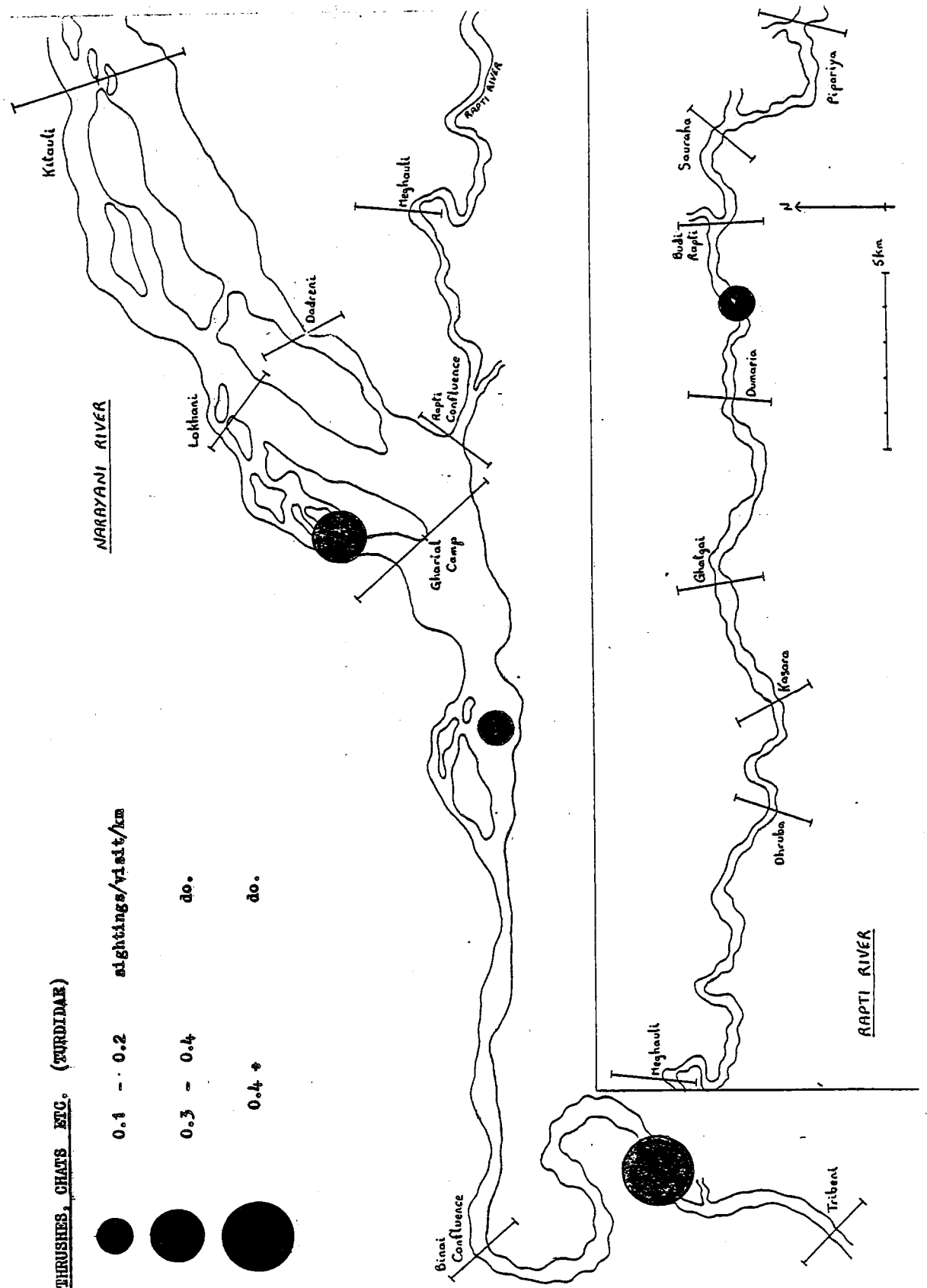
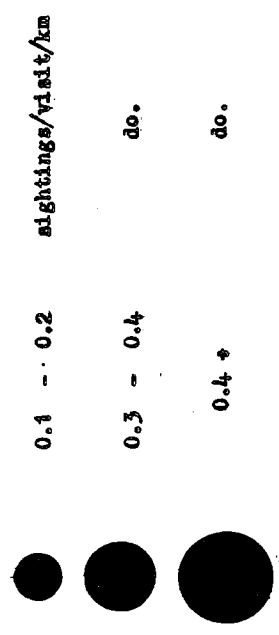
GULLS AND TERNS (LARIDAE)



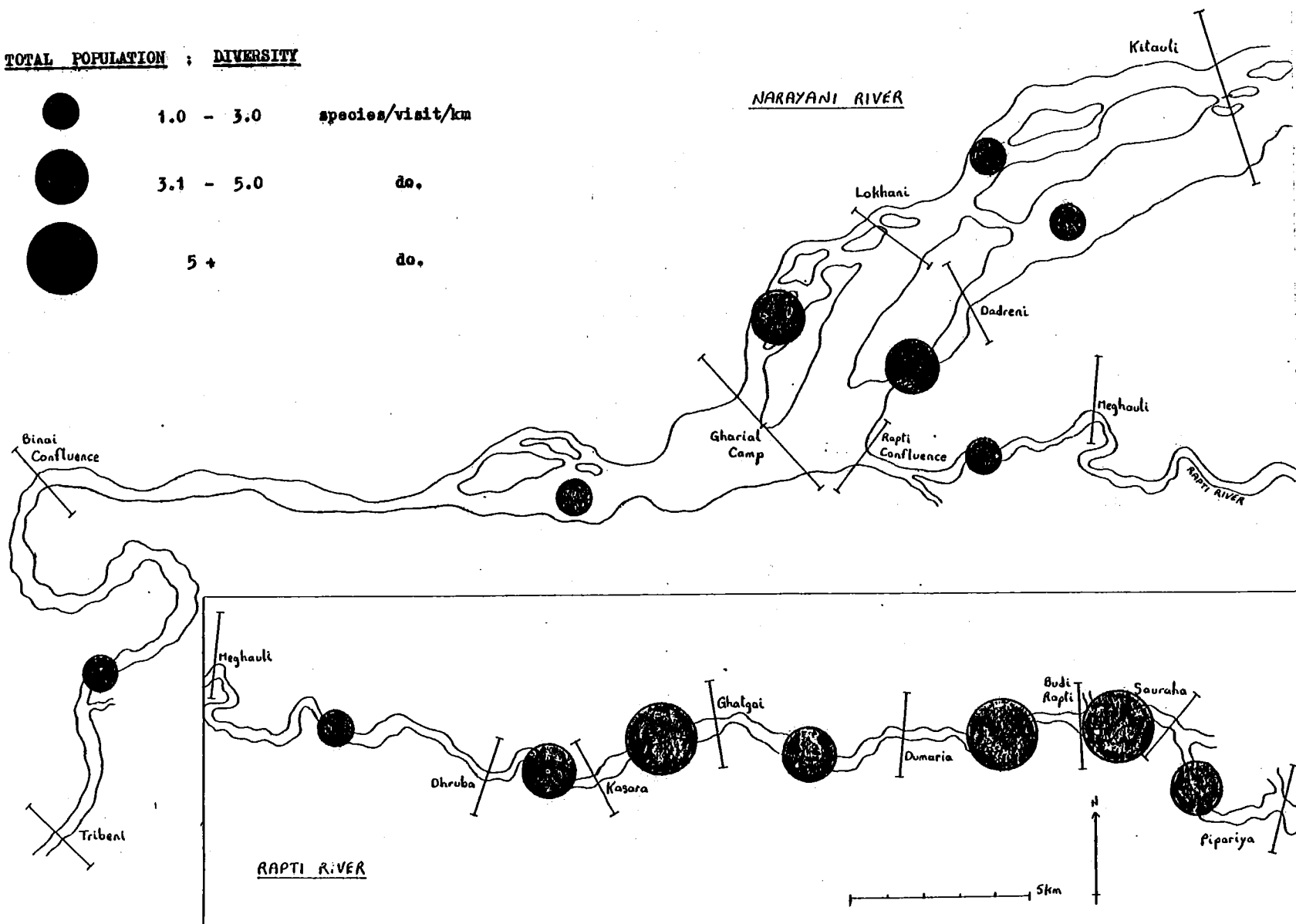
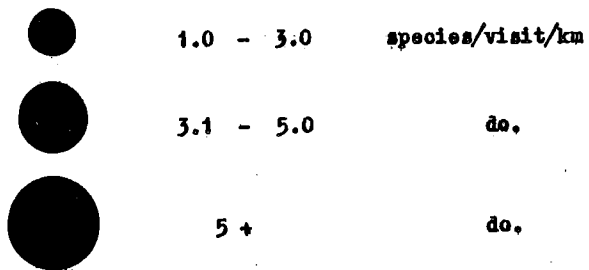
KINGFISHERS (ALCEDINIDAE)



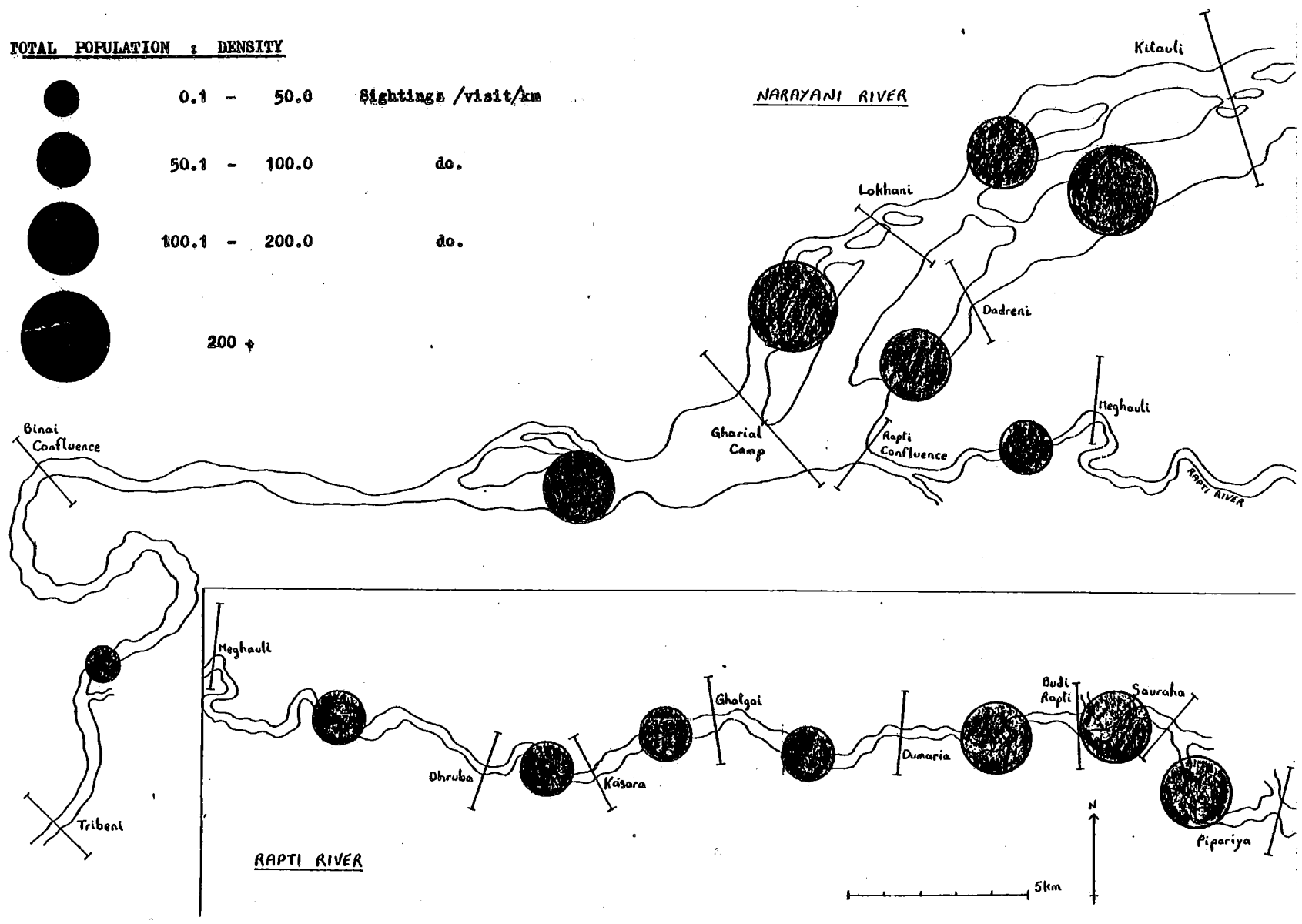
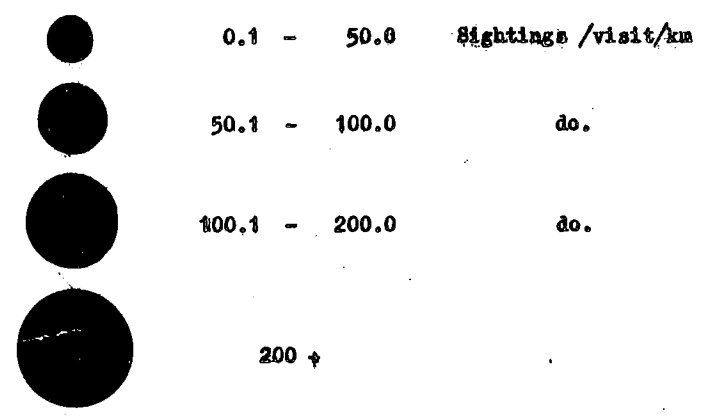
THRUSHES, CHATS ETC. (TURDIDAE)



TOTAL POPULATION ; DIVERSITY



**TOTAL POPULATION : DENSITY**



**SUMMARY TABLE : MIGRATORY AND RESIDENT BIRD POPULATIONS RECORDED ALONG RAPTII RIVER  
NOVEMBER AND DECEMBER 1982**

SECTION VISIT	I		II		III		IV		V		VI		VII		VIII		TOTAL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Large Cormorant	350	0	5	0	234	0	7	0	2	0	40	2	344	3	10	0	992	5
Gray Heron	1	-	-	-	2	2	-	2	1	-	-	2	1	1	1	-	6	7
Little Green Heron	-	-	-	-	1	3	-	-	-	-	-	-	-	2	-	-	1	5
Pond Heron	6	1	17	10	15	16	4	7	18	14	18	17	19	18	13	12	110	95
Little Egret	11	5	5	4	14	19	92	13	33	11	15	23	23	26	11	14	204	115
Intermed- iate Egret	3	1	-	-	3	1	35	11	43	3	2	3	8	1	-	1	94	21
Large Egret	1	-	-	-	5	3	2	3	6	1	3	1	5	9	5	2	27	19
Open-billed Stork	1	-	1	-	-	-	1	1	-	-	-	-	-	-	1	-	4	1
White-necked Stork	1	-	1	-	-	-	2	-	3	-	-	-	1	-	-	-	8	-
Black Stork	1	-	-	-	3	-	1	-	5	-	-	-	1	-	-	-	11	-
Black Ibis	20	-	5	-	1	4	20	4	6	4	27	-	28	11	16	-	123	23
Bar-headed Goose	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-
Ruddy Shelduck	573	221	103	303	150	131	132	150	83	51	112	61	280	260	203	142	1636	1319
Eurasian Shelduck	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	2	-
Common Teal	-	-	-	-	-	-	-	-	-	-	-	-	155	121	-	-	155	121
Spotbill	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-
Mallard	10	-	-	-	-	26	-	-	-	-	-	-	-	-	-	-	10	26
Gadwall	36	-	-	2	3	1	-	-	2	-	-	-	6	28	-	-	47	31
Eurasian Wigeon	34	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	42	-
Merganser	43	1	9	13	4	7	-	19	2	5	2	-	15	19	9	1	84	65
Fishing Eagle sp	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	-
Osprey	1	-	2	1	4	1	1	1	1	1	1	-	1	4	-	2	11	10
Red-wattled Lapwing	4	-	4	-	9	4	-	9	7	2	11	8	3	12	-	1	38	36
Spur-winged Lapwing	17	3	6	4	24	22	6	20	16	5	6	2	3	13	7	10	85	79
Eastern Gol- den Plover	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	-
Little Ring- ed Plover	15	10	12	5	12	18	2	17	9	7	23	23	5	27	6	9	84	116
Kentish Plover	9	5	13	1	19	19	32	10	4	1	7	-	2	11	8	130	94	177







SUMMARY TABLE (Continued) - NARAYANI RIVER

SECTION VISIT	I	II		III	IV	V		VI	TOTAL (estimate)
	B	A	B	B	B	A	B	A	
Eurasian Thick Knee	-	-	-	1	-	-	3	-	4
Great Thick Knee	-	-	-	7	3	12	4	1	15
Small Pratincole	3	-	6	20	-	22	21	-	50
Great Black-headed Gull	-	-	-	6	4	6	30	-	40
Black-headed Gull	-	-	-	-	1	-	3	-	4
Indian River Tern	-	-	1	2	2	-	12	-	17
Black-bellied Tern	-	-	-	2	6	13	25	5	38
Small Pied Kingfisher	-	2	4	3	6	8	16	-	29
Eurasian Kingfisher	-	3	-	-	-	2	7	2	9
White-breasted Kingfisher	4	-	1	-	-	-	1	1	7
White-capped River Chat	-	-	-	-	-	-	1	5	6
Plumbeous Redstart	-	2	3	-	-	-	1	3	7
Blue Rock Thrush	-	-	-	-	-	-	-	1	1
Wallcreeper	-	-	-	-	-	1	-	5	5

APPENDIX 1

Birds Recorded in the Vicinity of the Rapti and Narayani Rivers in the  
Royal Chitwan National Park (2nd November 1982 - 3rd January 1983)

GREAT CRESTED GREBE Podiceps cristatus

Single above Tribenighat barrage (24/11).

LARGE CORMORANT Phalacrocorax carbo

Flocks of up to c 750 (near Gharial Camp 19 - 26/12) along rivers.

DARTER Anhinga rufa

Single on Narayani; near Tented Camp (28/11) and Gharial Camp (18/12).

GRAY HERON Ardea cinerea

Singles along Rapti and Narayani.

PURPLE HERON Ardea purpurea

Single at Sauraha (19/11).

LITTLE GREEN HERON Butorides striatus

Singles along Rapti and Narayani.

POND HERON Ardeola grayii

Common along rivers and in adjacent fields.

CATTLE EGRET Bubulcus ibis

Common along fringes of rivers.

LARGE EGRET Egretta alba

Present in small numbers along rivers.

INTERMEDIATE EGRET Egretta intermedia

Small scattered flocks along rivers; up to 43 roosting at Ghatgai (4/12).

LITTLE EGRET Egretta garzetta

Common along rivers with up to 92 roosting at Ghatgai (21/11).

OPEN-BILLED STORK Anastomas oscitans

Singles along Rapti and 8 at Lokhani (23/12).

WHITE-NECKED STORK Ciconia episcopus

Singles along rivers; 2 Lami Tal (30/11).

BLACK STORK Ciconia nigra

Small parties of up to 12 (below Gharial Camp 19/12) along rivers.

BLACK-NECKED STORK Xenorhynchus asiaticus

Singles at Sauraha (8/11 and 17/11).

LESSER/

LESSER ADJUTANT STORK Leptoptilos javanicus

Small numbers over rivers, 2 Sauraha (7/11).

BLACK IBIS Pseudibis papillosa

Scattered flocks of up to 40 (Lokhani 23/12) along rivers.

BAR-HEADED GOOSE Anser indicus

4 Sauraha (9/11), 52 Gharial Camp (27/11) and 30 Lokhani (23/12).

LESSER WHISTLING TEAL Dendrocygna javanica

30 Lami Tal and 30 Tomar Tal near Kasara (30/11).

RUDDY SHELDUCK (BRAHMINY DUCK) Tadorna ferruginea

Abundant along rivers; 573 Sauraha (7/12).

EURASIAN SHELDUCK Tadorna tadorna

Single at Sauraha (17/11 - 6/12), single Dumaria (21/11) and single Kitauli (23/12).

PINTAIL Anas acuta

Flocks of up to 60 (below Gharial Camp 19/12) on Narayani River.

2 Tomar Tal, Kasara (30/11).

COMMON TEAL Anas crecca

Relatively common along rivers; c 600 Kitauli (23/12), 121 Meghauli (27/12), 30 Tomar Tal, Kasara (2/12).

SPOTBILL Anas poecilorhyncha

4 at Sauraha (7/12).

MALLARD Anas platyrhynchos

Flocks of up to 74 (Kitauli 23/12) along rivers. 20 Tribeni (24/11).

20 Tomar Tal (2/12).

GODWALL Anas strepera

Small flocks of up to 50 (2 flocks of 50 Kitauli 23/12) along rivers.

5 Tomar Tal (2/12).

EURASIAN WIGEON Anas penelope

Small flocks of up to 40 (Lokhani 28/11 and 24/12) along rivers; 34 Sauraha (7/12), 5 Tomar Tal, Kasara (30/11).

RED-CRESTED POCHARD Netta rufina

Pair and party of 3 at Lokhani (23/12).

TUFTED POCHARD Aythya fuligula

c 40 above Tribenighat barrage (24/11).

COTTON TEAL Nettapus coromandelianus

3 Lami Tal, Kasara (30/11) and a single Bagmara (18/12).

## MERGANSER/

MERGANSER (GOOSANDER) *Mergus merganser*

Fairly common along rivers, 40 Sauraha (7/12).

BLACK-SHOULDERED KITE *Elanus caeruleus*

Single recorded regularly at Sauraha.

HONEY KITE (HONEY BUZZARD) *Fernis ptilorhynchus*

Up to 4 regularly at Sauraha.

BLACK KITE *Milvus migrans*

Common at edge of Park.

CRESTED GOSHAWK *Accipiter trivirgatus*

Single near Kasara (2/12).

SHIKRA *Accipiter badius*

Singles at Sauraha and Kasara (17/12).

CRESTED SERPENT EAGLE *Spilornis cheela*

Singles and pairs throughout the area.

MOUNTAIN HAWK EAGLE *Spizaetus nipalensis*

Single near Ghatgai (1/12).

STEPPE EAGLE *Aquila nipalensis*

Regularly recorded at Sauraha and single near Tented Camp (Narayani) (28/11).

GREATER SPOTTED EAGLE *Aquila clanga*

Single at Sauraha (6/11).

LESSER SPOTTED EAGLE *Aquila pomarina*

Single near Tented Camp (21/12).

BLACK EAGLE *Ictinaetus malayensis*

Single Lokhani (24/12).

FISHING EAGLE sp.

Singles at Dumaria Creek (16/12) - probably Himalayan Gray-headed Fishing Eagle *Icthyophaga nana* - and Bagmara (18/12) - possibly Fallas's Fishing Eagle *Haliaeetus leucoryphus* (adult reported at Rapti Confluence 5/1/83).

OSPREY *Pandion haliaetus*

Singles regularly recorded along rivers (c 11 Rapti and c 9 Narayani).

CINEREOUS VULTURE (EUROPEAN BLACK VULTURE) *Aegyptius monachus*

Single near Gharial Camp (21/12).

EURASIAN GRIFFON *Gyps fulvus*

Small numbers throughout the area.

BLACK VULTURE (KING VULTURE) *Torgos calvus*

Singles near Gharial Camp (21/12) and near Dumaria on Rapti River (28/12).

WHITE-/

- 4
- WHITE-BACKED VULTURE Gyps bengalensis  
Common throughout the area.
- INDIAN GRIFFON Gyps indicus  
Common throughout the area.
- EGYPTIAN VULTURE Neophron percnopterus  
Single near Gharial Camp (21/12).
- HEN HARRIER Circus cyaneus  
Singles recorded throughout the area.
- PIED HARRIER Circus melanoleucos  
Single males at Sauraha (19/11, 6/12 and 28/12).
- MARSH HARRIER Circus aeruginosus  
Singles throughout the area.
- LAGGAR FALCON Falco jugger  
Single at Sauraha (5/11).
- PEREGRINE FALCON Falco peregrinus  
Singles recorded throughout the area.
- EURASIAN KESTREL Falco tinnunculus  
Singles regularly at Sauraha.
- BLACK PARTRIDGE Francolinus francolinus  
2 Sauraha (8/12).
- COMMON PEAFOWL Pavo cristatus  
Common throughout the area.
- RED JUNGLE FOWL Gallus gallus  
Common throughout the area.
- BROWN CRAKE Amaurornis akool  
Single at Sauraha (18/11).
- WHITE-BREASTED WATERHEN Amaurornis phoenicurus  
Several at Sauraha (6/11).
- INDIAN GALLINULE Gallinula chloropus  
Common on ponds at Sauraha, Lami and Tomar Tal, Kasara.
- COOT Fulica atra  
Common on ponds at Sauraha and Tals at Kasara.
- RED-WATTLED LAFWING Vanellus indicus  
Small numbers along the Rapti and upper Narayani.

SFUR-/

SPUR-WINGED LARWING Vanellus spinosus

Pairs and small groups along rivers.

EASTERN GOLDEN PLOVER Fluvialis dominica

Single recorded with a flock of Kentish Plovers at Ghatgai (4/12).

LITTLE RING PLOVER Charadrius dubius

Paired birds along rivers.

KENTISH PLOVER Charadrius alexandrinus

Singles and small parties along rivers; 120 Meghauli (26/12), 30 Ghatgai (4/12).

GREENSHANK Tringa nebularia

Common along rivers; 102 Ghatgai (4/12), 79 Kasara (1/12), 40 Kitauli (23/12) and 36 Lokhani (28/11).

COMMON REDSHANK Tringa totanus

Small numbers along rivers; 20 Dhruba (27/12).

SPOTTED REDSHANK Tringa erythropus

2 Dumaria and singles at Ghatgai and Kasara (28/12).

WOOD SANDPIPER Tringa glareola

4 Ghatgai and singles at Dumaria and Kasara (28/12).

GREEN SANDPIPER Tringa ochropus

Small numbers along rivers and ponds at Sauraha.

COMMON SANDPIPER Tringa hypoleucos

Small numbers along rivers and ponds at Sauraha.

LITTLE STINT Calidris minutus

4 Sauraha (8/11 and 5/12), 3 Dumaria (5/12), single Dumaria (28/12), 3 Meghauli (26/12), 2 Dhruba (26/12), 4 Ghatgai (28/12), and single at Rapti Confluence (22/12).

TEMMINCK'S STINT Calidris temminckii

Common along rivers.

DUNLIN Calidris alpinus

22 Dumaria (28/12), 5 Ghatgai (1/12), 2 Ghatgai (28/12), 8 Dumaria (5/12), single Meghauli (5/12), 5 Dhruba (27/12) and 7 Rapti Confluence (26/11).

CURLEW SANDPIPER Calidris ferruginea

4 Budi Rapti (8/11), 3 Sauraha (9/11), 3 Ghatgai (21/11 and 1/12) and a single at Dumaria (28/12).

FANTAIL/

FANTAIL SNIPE Capella gallinago

Singles at Sauraha (8/11), Dhruba (26/12), Lokhani (28/11 and 23/12) and pairs at Dumaria (28/12) and Dhruba (27/12).

AVOCEET Recurvirostra avosetta

7 Sauraha (9/11).

EURASIAN THICK KNEE (STONE FLOWER) Burhinus oedicnemus

Pair at Dumaria (7/11), 3 Binai Confluence (19/12) and single Dadreni (22/12).

GREAT THICK KNEE (GREAT STONE FLOWER) Esacus magirostris

Pairs and up to 6 (below Gharial Camp 25/11) on Narayani River and 3 Dumaria (21/11) and single at Dumaria (28/11).

SMALL PRATINCOLE Glareola lactea

Flocks of up to 300 + (Sauraha 17/11) on Rapti River and small numbers on Narayani.

GREAT BLACK-HEADED GULL Larus ichthyaetus

Singles and flocks of up to 20 (Gharial Camp 26/12) along rivers; 12 Meghauli (3/12) and 6 Sauraha (17/11).

BLACK-HEADED GULL Larus ridibundus

Single at Sauraha (17/11), pair at Sauraha (21/11), pair at Ghatgai (1/12), 4 Meghauli (3/12), 3 below Gharial Camp (20/12) and single at Rapti Confluence (22/12).

BROWN-HEADED GULL Larus brunnicephalus

Single at Kasara (30/11).

INDIAN RIVER TERN Sterna aurantia

Singles and parties of 2 to 6 birds (6 below Gharial Camp 19/12) along rivers.

BLACK-BELLIED TERN Sterna acuticauda

Singles and pairs along rivers; 5 Binai Confluence (24/11) and 5 Dhruba (3/12).

GRAY-FRONTED GREEN PIGEON Treron pompadora

Sauraha (1/1)

BENGAL GREEN PIGEON Treron phoenicoptera

c 30 Sauraha (16/12).

RUFIOUS TURTLE DOVE Streptopelia orientalis

Recorded at Sauraha.

INDIAN RING DOVE Streptopelia decaocto

Fairly common throughout the area.

SPOTTED DOVE Streptopelia chinensis

Common throughout the area.

## EMERALD/



- EMERALD DOVE Chalcophaps indica  
Single at Sauraha (8/12).
- ROSE-RINGED PARAKEET Psittacula krameri  
Abundant throughout the area.
- LARGE PARAKEET Psittacula eupatria  
Flocks in sal forest at Kasara (2/12).
- BLOSSOM-HEADED PARAKEET Psittacula cyanocephala  
6 Dhruba (3/12) and small numbers at Sauraha.
- COMMON HAWK CUCKOO Cuculus varius  
Singles at Sauraha (9/12 and 3/1)
- LARGE GREEN-BELLIED MALKOHA Rhopodytes tristis  
2 Sauraha (9/12).
- LARGE COUCAL (CROW PHEASANT) Centropus sinensis  
Regularly recorded at Sauraha.
- BROWN FISH OWL Bubo zeylonensis  
Single at Sauraha (3/11).
- BARRED OWLET Glaucidium cuculoides  
Single at Sauraha (6/11).
- SPOTTED OWLET Athene brama  
Recorded regularly at Sauraha (family party 3/1).
- BROWN HAWK OWL Ninox scutulata  
Single at Sauraha (19/11).
- LONG-TAILED NIGHTJAR Caprimulgus macrurus  
Single at Sauraha (9/11).
- INDIAN ROLLER Coracias benghalensis  
Common throughout the area.
- HOOPOE Upupa epops  
Regularly recorded at Sauraha.
- LARGE PIED KINGFISHER Ceryle lugubris  
Two singles at Dumaria (21/11).
- SMALL PIED KINGFISHER Ceryle rudis  
Relatively common along rivers.
- EURASIAN KINGFISHER Alcedo atthis  
Small numbers along rivers.
- STORK-/

STORK-BILLED KINGFISHER Pelargopsis capensis

Singles along Rapti near Kasara and Dumaria (28/12) and Dumaria Creek (16/12).

WHITE-BREASTED KINGFISHER Halcyon smyrensis

Small numbers along rivers.

GREEN BEE-EATER Merops orientalis

Regularly recorded at Sauraha.

PIED HORNBILL Anthracoceros melabaricus

Pairs at Sauraha (3/11, 8/12 and 3/1).

GIANT HORNBILL Buceros bicornis

Pair near Rapti Confluence (26/12).

LINEATED BARBET Megalaima lineata

Regularly recorded at Sauraha.

GRAY-CROWNED FIGMY WOODPECKER Dendrocopos canicapillus

Single in sal forest at Dhruba (2/12).

BLACK-NAPE WOODPECKER Picus canus

Single in sal forest at Kasara (30/11).

SMALL YELLOW-NAPE WOODPECKER Picus chlorolophus

Single in sal forest at Kasara (30/11) and at Sauraha (6/12).

LESSER GOLDEN-BACKED WOODPECKER Dinopium benghalense

Singles at Tribeni (24/11) and Kasara (30/11).

THREE-TOED GOLDEN-BACKED WOODPECKER Dinopium shorii

Pairs and singles recorded regularly at Sauraha.

FULVOUS-BREASTED PIED WOODPECKER Dendrocopos macei

Recorded regularly at Sauraha.

YELLOW-FRONTED PIED WOODPECKER Dendrocopos mahrattensis

Single at Sauraha (5/11).

SAND LARK Calandrella raytal

Small flocks along sandy river banks.

HOUSE SWIFT Apus affinis

Small numbers at Sauraha.

CRESTED SWIFT Hemiprocne longipennis

Up to 30 in vicinity of rivers (Sauraha to Tribeni).

SAND MARTIN Riparia paludicola

Abundant along rivers in vicinity of steep sand banks (400 + pairs breeding at Sauraha).

BARN/

- BARN SWALLOW Hirundo rustica  
Common in vicinity of rivers.
- STRIATED SWALLOW Hirundo daurica  
Small numbers at Sauraha.
- BAY-BACKED SHRIKE Lanius vittatus  
Single at Tribeni (24/11).
- BLACK-HEADED or RUFOUS-BACKED SHRIKE Lanius schach  
Recorded throughout the area.
- BLACK-HEADED ORIOLE Oriolus xanthornus  
Recorded regularly at Sauraha and Gharial Camp.
- WHITE-BELLIED DRONGO Dicrurus caerulescens  
Singles recorded regularly at Sauraha.
- HAIR-CRESTED DRONGO Dicrurus hottentottus  
Small parties recorded regularly at Sauraha.
- ASHY DRONGO Dicrurus leucophaeus  
Recorded throughout the area.
- BLACK DRONGO Dicrurus adsimilis  
Common throughout the area.
- CROW-BILLED DRONGO Dicrurus annectans  
Recorded regularly at Sauraha.
- ASHY WOOD-SWALLOW Artamus fuscus  
Small flocks recorded regularly at Sauraha.
- BRAHMINY MYNA Sturnus pagodarum  
Small numbers at Tribeni (24/11).
- GRAY-HEADED MYNA Sturnus malabaricus  
Small flocks at Sauraha.
- PIED MYNA Sturnus contra  
Common throughout the area.
- COMMON MYNA Acridotheres tristis  
Abundant throughout the area.
- JUNGLE MYNA Acridotheres fuscus  
Common throughout the area.
- RED-BILLED BLUE MAGPIE Cissa erythrorhyncha  
5 at Kasara (30/11).
- INDIAN/

- INDIAN TREE PIE Dendrocitta vagabunda  
Recorded regularly throughout the area.
- JUNGLE CROW Corvus macrorhynchos  
Recorded throughout the area.
- LARGE CUCKOO-SHRIKE Coracina novaehollandiae  
Pairs and singles at Tribeni and Sauraha.
- BLACK-HEADED CUCKOO-SHRIKE Coracina melanoptera  
Single at Sauraha (3/1).
- SCARLET MINIVET Pericrocotus flammeus  
Small flock near Gharial Camp (25/11).
- SMALL MINIVET Pericrocotus cinnamomeus  
Small flock at Dhruba (2/12).
- IORA Aegithina tiphia  
Recorded regularly at Sauraha.
- GOLDEN-FRONTED LEAF BIRD Chloropsis aurifrons  
Several at Sauraha (3/1).
- BLACK-HEADED YELLOW BULBUL Pycnonotus melanicterus  
Single near Gharial Camp (25/11).
- RED-WHISKERED BULBUL Pycnonotus jocosus  
Common throughout the area.
- RED-VENTED BULBUL Pycnonotus cafer  
Common throughout the area.
- RED-CAPPED BABBLER Timalia pileata  
Recorded regularly at Gharial Camp.
- STRIATED BABBLER Turdoides earlei  
Several at Gharial Camp (27/11).
- JUNGLE BABBLER Turdoides striatus  
Small parties recorded throughout the area.
- RED-BREASTED FLYCATCHER Muscicapa parva  
Recorded regularly at Sauraha.
- LITTLE PIED FLYCATCHER Muscicapa westermanni  
Single (male) at Sauraha (29/12).
- VERDITER FLYCATCHER Muscicapa thalassina  
Singles at Sauraha (17/12).
- GRAY-/

GRAY-HEADED FLYCATCHER Culicicapa ceylonensis

Recorded throughout the area .

RUFIOUS-CAPPED BUSH WARBLER Cettia brunnifrons

Recorded regularly throughout the area.

ZITTING CISTICOLA (FANTAIL WARBLER) Cisticola juncidis

Single near Kitauli (23/12).

RUFIOUS PRINIA Prinia rufescens

Recorded regularly at Sauraha, Kasara and Gharial Camp.

JUNGLE PRINIA Prinia sylvatica

Small numbers at Sauraha and Gharial Camp.

PLAIN PRINIA Prinia subflava

Small numbers at Sauraha.

YELLOW-BELLIED PRINIA Prinia flaviventris

Recorded regularly at Gharial Camp.

TAILOR BIRD Orthotomus sutorius

Recorded regularly at Kasara and Sauraha.

STRIATED MARSH WARBLER Megalurus palustris

Single at Sauraha (18/11).

BROWN LEAF WARBLER (CHIFFCHAFF) Phylloscopus collybita

Singles at Sauraha (17/12).

TICKELL'S LEAF WARBLER Phylloscopus affinis

Small numbers at Sauraha (20/11).

DUSKY LEAF WARBLER Phylloscopus fuscatus

2 near Gharial Camp (20/12).

DULL GREEN LEAF WARBLER (GREENISH WARBLER) Phylloscopus trochiloides

Small numbers at Sauraha.

PLAIN LEAF WARBLER (YELLOW-BROWED WARBLER) Phylloscopus inornatus

Recorded in small numbers throughout the area.

ORANGE-BARRED LEAF WARBLER Phylloscopus pulcher

2 at Sauraha (1/1).

CROWNED LEAF WARBLER Phylloscopus reguloides

Small numbers at Sauraha.

HIMALAYAN RUBYTHROAT Erithacus pectoralis

Single (male) at Sauraha (31/12).

BLUETHROAT/

BLUETHROAT Erithacus svecicus

Regularly (after 7/12) in small numbers at Sauraha and Gharial Camp.

SHAMA Copsychus malabaricus

Single (male) near Sauraha (16/12).

ROBIN DAYAL (MAGPIE ROBIN) Copsychus saularis

Common throughout the area.

BLACK REDSTART Phoenicurus ochruros

Singles recorded from Sauraha to Tribeni.

WHITE-CAPPED RIVER CHAT Chaimarrornis leucocephalus

Two pairs (24/11) and two singles (24/11 and 19/12) near Binai Confluence.

PLUMBEOUS REDSTART Rhyacornis fuliginosus

Small numbers at Binai Confluence, Lokhani and Dumaria.

BLACK-BACKED FORKTAIL Ericurus immaculatus

Single at Dumaria Creek (16/12).

COLLARED BUSH CHAT (STONE CHAT) Saxicola torquata

Common throughout the area.

DARK-GRAY BUSH CHAT Saxicola ferrea

Singles at Sauraha.

PIED BUSH CHAT Saxicola caprata

Common throughout the area.

BLUE ROCK THRUSH Monticola solitarius

A single (male) at Binai Confluence (24/11).

BLACK-THROATED THRUSH Turdus ruficollis

Single (male) at Kasara (4/12).

GRAY TIT Parus major

Common throughout the area.

CHESTNUT-BELLIED NUTHATCH Sitta castanea

Singles at Sauraha and Kasara.

VELVET-FRONTED NUTHATCH Sitta frontalis

Singles in sal forest at Kasara.

WALL CREEPER Tichodroma muraria

6 Tribeni to Binai Confluence (24/11).

HODGSON'S TREE PIPIT (OLIVE-BACKED PIPIT) Anthus hodgsoni

Regularly recorded at Sauraha.

PADDYFIELD/

PADDY FIELD PIPIT (RICHARD'S PIPIT) Anthus novaeseelandiae

Common throughout the area.

EURASIAN TREE PIPIT Anthus trivialis

2 Kasara (2/12).

YELLOW WAGTAIL Motacilla flava

Relatively common along rivers.

GRAY WAGTAIL Motacilla caspica

Small numbers along rivers.

YELLOW-HEADED WAGTAIL (CITRINE WAGTAIL) Motacilla citreola

Small numbers along rivers.

PIED WAGTAIL (WHITE WAGTAIL) Motacilla alba

Common along rivers and abundant at roosts.

LARGE PIED WAGTAIL Motacilla maderaspatensis

Recorded regularly along rivers.

SCARLET-BREASTED SUNBIRD Aethopyga siparaja

Several at Sauraha (3/1).

PURPLE SUNBIRD Nectarinia asiatica

Regularly recorded at Sauraha.

WHITE-EYE Zosterops palpebrosa

Recorded throughout the area.

HOUSE SPARROW Passer domesticus

Recorded throughout the area.

BAYA WEAVER Floceus philippinus

Large flocks at Sauraha (18/11).

BLACK-THROATED WEAVER Floceus benghalensis

Large flocks at Sauraha (18/11).

SPOTTED MUNIA Lonchura punctulata

Small flocks recorded regularly at Sauraha.

COMMON ROSE FINCH Carpodacus erythrinus

Common at Sauraha in November.

YELLOW-BREASTED BUNTING Emberiza aureola

Small numbers at Sauraha (6/11).

CRESTED BUNTING Melophus lathami

Singles recorded regularly at Sauraha.

APPENDIX 2

Mammals Recorded in the Vicinity of the Rapti and Narayani Rivers in the  
Royal Chitwan National Park (2nd November 1982 - 3rd January 1983)

INDIAN ONE-HORNED RHINOCEROS Rhinoceros unicornis

Singles and females with young were recorded regularly at Sauraha and occasionally at Gharial Camp.

SPOTTED DEER or CHITAL Axis axis

Herd of up to 30 + throughout the area.

HOG DEER Axis porcinus

Recorded regularly at Sauraha and Kasara.

BARKING DEER Muntiacus muntjak

Recorded occasionally at Sauraha and Kasara.

SAMBAR Cervus unicolor

Recorded occasionally at Sauraha and Kasara.

WILD BOAR Sus scrofa

Recorded regularly at Sauraha.

ROYAL BENGAL TIGER Panthera tigris tigris

Heard on two occasions, near Kasara (2/12) and near Sauraha (1/1). Tracks seen in many localities.

LEOPARD Panthera pardus

Adult male at Sauraha (7/11).

LANGUR MONKEY Presbytis entellus

Several on cliffs by river near Tribeni (24/11).

RHESUS MACAQUE MONKEY Mucaca mulatta

Common throughout the area.

JACKAL Canis aureus

Singles near Gharial Camp (18/12 and 19/12).

MONGOOSE Herpestes edwardsi

Recorded occasionally at Sauraha.

COMMON OTTER Lutra lutra

2 pairs near Tented Camp (22/11 and 28/11).

INDIAN RUFOUS-TAILED HARE Lepus nigricollis ruficaudatus

Recorded occasionally at Sauraha.

REPTILES/



REPTILESMARSH MUGGER Crocodilus palustris

Small numbers along rivers and small lake near Bagmara.

GHARIAL Gavialis gangeticus

Small numbers recorded regularly on Narayani and a single (adult) at only one locality (near Dumaria Creek) on the Rapti.

INDIAN PYTHON

Single near Tented Camp (28/11).