

SUPPLEMENT

ROYAL CHITWAN NATIONAL PARK
 PROPOSED EXTENSIONS AND ADJACENT RESERVES

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1. INTRODUCTION

The possibility of extending the Royal Chitwan National Park or of annexing adjacent Wildlife Reserves has been scheduled for investigation for some time, emphasis being placed especially on the land to the west of the park and the Dauneey Hills.

The case for extending the park is certainly sound since from a wildlife conservation viewpoint Chitwan is of paramount importance, both nationally and internationally, and in the context of national development it has the potential of an outstanding tourist attraction.

Preliminary field studies both to the east and west of the park were carried out during January, February and March of this year (1975) and some firm recommendations can now be made. In the following pages the possibilities are considered and proposals are put forward for eastern and western extensions. Suggestions for development and management policy are offered but it is clear that certain decisions must be based upon at least a rough cost-benefit analysis of the situation. Yet, where resettlement problems are involved, no estimates of cost are available. It is therefore impossible to make out a solid proposal which could, for example, be put before a donor agency. Nevertheless it is hoped that by focusing on such problems this report will prove to be a useful aid to planning at National Parks Headquarters.

2. EXTENSIONS TO THE WEST

2.1 Western Extensions in Chitwan District

2.1.1 Location, Topography and Access

Chitwan District, west of the park, comprises a compact area of about 52 square miles (135 sq km) lying between the Narayani River and the Nepal-India border.

The land is extremely broken and dissected by innumerable seasonal streams. Superficially, at least, the country is indistinguishable from the adjacent Someswar Hills within the park.

Rising from the banks of the Narayani at about 400 ft a.s.l. the hills rise to peaks of over 1000 ft. Ridges run mainly east-west, drainage being for the most part westward to the Narayani by the Kana, Marha and Panchnad Rivers.

Access to the area is by boat down the Narayani, the trip from the Narayani - Rapti confluence to the mouth of the Kana River taking about six hours. Thereafter a few hours' walk along this river brings one to the heart of the area. The course of the Kana River is a convenient and most attractive access route into this otherwise difficult terrain. From the existing park it is possible to walk to the headwaters of the Kana River in a day from Chamka Chowki. Again, a few hours' walk downstream brings one to the centre of the area.

The foot-survey followed a route from the mouth of the Marha River (having hired canoes from the Narayani - Rapti confluence) - along the course of the Marha and eastwards to a point a little east of 84° 0'E thence northwards by compass, crossing the Kana River and following a tributary to the crest of the ridge immediately south of the Narayani.

The foot of this ridge i.e. the south bank of the Narayani, was then followed back westwards almost to the south bend of the river. The journey back to the Rapti was via Tiger Tops tented camp and the footpath past Devi Tal to Munda Tal.

An air survey around the boundaries proposed in this report was carried out on 31 May 1975.

2.1.2 Natural Vegetation and Wildlife

Sal forest clothes this country almost exclusively, good grass cover (generally about one meter high) occurs on the tops of the ridges and there are some areas of tall flood-plain grassland associated with the lower reaches of the Kana and Marha Rivers.

Riverine vegetation tends to be a dense tangle of lianes and river-side trees with Pandanus palms, supported by 6-10 foot long prop-roots, a conspicuous and exotic feature. Belts of bamboo are extensive along the headwaters and Phoenix palms are abundant on the slopes in the less well-developed sal-forest.

Throughout the area traversed on foot evidence of sambar was common and tracks and calls of barking deer were recorded in good number. Wild boar were obviously abundant as were langur monkeys.

Tiger were found to be surprisingly plentiful and the tracks of at least ten individuals were encountered. Tracks of three leopard and two (possibly three) bear were also noted. There was no evidence of gaur or other large mammals. Rhino were found to occur, in small numbers only, along the south bank of the Narayani.

Five gharial and two mugger were noted during the 6 hour boat journey. Among birds the beautiful green magpie (Cissa chinensis) was the only species recorded (Narayani south bank) which does not appear on the Chitwan check list.

2.1.3 Land Use and Human Impact

Human interest at present seems to be limited to seasonal grazing by pastoralists who cross the Narayani from the west and penetrate into the grassland around the lower reaches of the Kana and Marha Rivers. Bamboo and other forest produce is collected on a small scale but in much of the country around the headwaters of the Kana and Marha Rivers there was no sign of man.

2.1.4 Recommendations

In view of the relatively light human interest in this area, the insignificant agricultural potential, the unspoilt state of the country, the reasonably easy access from the east, and above all, the encouraging number of tiger in the area, it is recommended that the whole of this region be incorporated into the Royal Chitwan National Park. A simple revision of the boundary description is suggested in Appendix II. The left bank of the Narayani will be subject to park control and this should facilitate protection of the now alarmingly scarce gharial; it will surely do so if regular nesting sites can be located and guarded in season. Hopefully, the Tribenighat barrage will be operated so as to allow an adequate passage of fish up-river.

Initially, administrative organisation could most conveniently be based on Khorla Mohan District HQ. For a start, three guard posts should be established, one at the mouth of the Kana River, one on the south bank of the Narayani, say opposite the mouth of the Binai River, and a third at some suitable spot west of the Tiger Tops tented camp. These three would be accessible from the river, and in this connection a park motor launch might prove very

useful. There are however some shallow stretches upstream of the Binai confluence and this might limit the type of craft which could be used. Boats with a heavy fuel consumption would also be unsuitable. The most reliable transport might be light paddle boats fitted with protected propeller motors which need only be used on the up-river journey. Shallows could then be negotiated manually.

A fourth outpost will be needed in the southern part of the area but this will have to be set up at a later stage when access routes have been determined. It may be possible, for example, to open up an elephant route from the tented camp to the south-eastern part of the annexed region.

The guards based at the first three outposts should carry out familiarisation patrols of their areas with a view to opening up footpaths, discovering suitable camp sites and generally recording observations on wildlife and natural features.

It may be possible to open up a STOL air strip near the mouth of the Kana or Marha Rivers and this will have to be investigated as an early priority.

The Kana River clearly represents a main artery through this whole stretch of country and a semi-permanent camp site somewhere along the course will almost certainly prove to be invaluable.

Further suggestions for structural development would be premature at this stage; the possibilities will come to light when the whole region has been subjected to a season's exploration by guards based in the area. Guard posts will also serve as base-camps enabling visiting staff from HQ to spend longer periods studying the area than is possible when all provisions and equipment have to be carried on one's back!

2.2 Nawalpur and the Daune Hills

The Nawalparasi report (Berry et al. 1974) recommended that a Game Reserve should be declared to include the Daune Hills, some 12 miles west of the park which would be connected to it by a strip of forest bordering the north bank of the Narayani River. This is shown on Map 4.

The riverine forest strip north of the Narayani does support rhino but rhino do not occur in the Daune Hills. Forest guards, under control of Tikoli and based at Chowkis along the north bank of the Narayani, afford the rhino some protection and in view of the extent of human activity along this north bank it is not recommended that anything more than control of poaching should be attempted here. There is no park or reserve development potential nor is the region essential for rhino conservation in Chitwan, provided that rhino which cross to the north bank do not fall victim to poachers. Effective crop protection will be either

impossible or prohibitively expensive and would certainly overload the guard force of the Chitwan park. Fortunately the area is geographically separate from the park and one feels that the sooner it is brought entirely under productive agriculture the better. Deprived of cover and daytime shelter rhinos will be less inclined to remain there.

The boundaries of the Dauneys Hills Game Reserve, as shown in the Nawalparasi report, merge, often imperceptibly, with the sal forest which Berry's team considered to be in need of forest conservation measures. The very brief investigation during March did not reveal any concentration of wildlife within the 'Game Reserve' section of the sal and the signs indicated that game animals were thinly distributed throughout the forest both inside and outside the suggested Game Reserve. The presence of sambar, boar, muntjac, bear and leopard was noted and there are reports that gaur occur near the Narayani. Density of game appeared to be low compared with similar hill country further east and conversations with highway engineers supported this view. Birdlife was not noticeably distinct from that which occurs in similar habitat further east.

The Dauneys Hills (which are traversed by the east-west highway) are precipitous and a large proportion of the area is without surface water during the dry season. The south-facing slopes were extremely dry with sparse grass cover beneath the sal. The terraces and narrow flood plain of the Binai Khola and its tributaries between Dumkibas and the Narayani are cultivated and settled. Local people collect a variety of forest products from the Dauneys Hills.

In brief, I found nothing to justify an attempt to annex this stretch of country to the Chitwan National Park. Nor did it appear to be worthy of autonomous status as a reserve. If, at different times of the year, game does concentrate in the Dauneys Hills, it might be useful shikar country; the ready access could mean that hunting trips would be worthwhile even though no outstanding trophy animals are available.

For the time being I would recommend that the Dauneys Hills, along with adjacent hill forest, be considered as forest land in need of conservation. Timber, soil and water certainly need to be conserved but specific conservation measures for wildlife in this area must come low on our list of priorities.

3. EXTENSIONS TO THE EAST

3.1 Location, Topography and Access

The country to be considered here lies immediately east of the present eastern section of the park boundary, extending eastwards beyond the Chitwan District boundary to about 84° 43' E. It thus comprises the south bank of the Rapti, a segment of the Churia Range and the southern foothills of the Churias as far south as the present south-east extremity of the park (Amwa). The area can be reached from north of the Rapti by dry-season motor track which fords the river near the Hasta Khola confluence (Map 6). In the south a dry weather motor track runs from the Hetauda - Birgunj road to Shikaribas, Thori and Amwa. With the completion of the Bhankatta - Amwa road within the park the region will thus be linked by dry weather road to the present park headquarters. A foot survey carried out during March followed the route - Sauraha - Amwa - Thori - Shikaribas - Dharang Khola - Hasta Khola - Rapti - Sauraha. Because of the need to keep one's rucksack as light as possible no plant collections were made and the survey took the form of a general reconnaissance. Three days were spent encamped on the Dharang Khola and two days on the Hasta Khola. Numerous exploratory treks were made off the survey route but no attempt was made to conduct censuses; quantification under these circumstances was not considered worthwhile.

3.2 Natural Vegetation and Wildlife

South of the Rapti the rich alluvial plains are cultivated approximately as far east as Amrita. Further east sal forest extends virtually to the bank of the river. Cultivation is also extensive south of the Churia between Amwa and Shikaribas.

The Churia range is forested with sal associations predominating. Chir pine (*P. roxburghii*) occurs within the sal on both northern and southern slopes at higher levels. It was also, surprisingly, recorded in the riverine forest strip (Khair-Sissoo) along the Dharang and Hasta Rivers below 1,500 feet. Phoenix palms are generally abundant beneath the sal where grass cover is usually sparse. Tall tussock grasses form denser cover on the crests of the ridges and there are extensive brakes of bamboo on the wetter, north-facing slopes. At the time of the survey the north-facing slopes were markedly wetter than the south slopes with standing pools in the headwaters of the Hasta Khola and high humidity beneath the tree canopy.

The following larger mammals were recorded along the survey route:

Rhesus Monkey Macaca mulatta

Large troops seen on the Dharang Khola and on the Rapti.

Common Langur Presbytis entellus

Numerous; troupes were frequently noted on water courses throughout the area.

Jackal Canis aureus

Seen near Dharang and Rapti Rivers.

Sloth Bear Melursus ursinus

Tracks and droppings noted on Dharang and Hasta Rivers. One adult was seen digging into a termite chamber near the Dharang Khola.

Crab Eating Mongoose Herpestes urva

Single specimen seen on Dharang Khola

Leopard Panthera pardus

Tracks of only two individuals positively identified, both on Dharang Khola.

Tiger Panthera tigris

Tracks of 3 (possibly 4) individuals were noted on the Dharang and Hasta Rivers. Spoor of a further animal was recorded on the Rapti.

Elephant Elephas maximus

Dung (not fresh) was found on the higher reaches of the Dharang Khola. Domestic elephants were said to have passed through Shikaribas some days earlier but there was no evidence of their having travelled up the Dharang Khola and the droppings appeared to have been made by a solitary animal crossing the river bed from west to east.

Wild Boar Sus scrofa

Plentiful evidence in the vicinity of all watercourses. A sounder of seven animals was seen on the Dharang Khola.

Muntjac Muntiacus muntjac

Individuals were heard barking near Amwa and at two localities on the Dharang Khola. A pair was observed west of Shikaribas and a third animal was seen on the Hasta Khola near its confluence with the Rapti. Tracks indicated that muntjac are well-distributed, at least in the vicinity of watercourses.

Chital Axis axis

A relatively small proportion of the area appeared to be suitable for chital. A herd (size not determined) was heard calling in sal immediately west of the Dharang Khola some five miles north of Shikaribas. About two miles further upstream a trio of stags was seen crossing the river from the east (one adult, 2 subadults, all

in velvet 20 March '75). No sign of chital was found on the Hasta Khola though it is said they occur and one would certainly expect to find chital on the lower reaches of the river.

Sambar Cervus unicolor

Sambar tracks were noted on both the Dharang and Hasta Rivers and a fine stag was observed on the west of the Churias between the headwaters of these rivers. However it did not appear that sambar were as numerous in this region as in the proposed western extension.

Gaur Bos gaurus

Three animals were observed (2 on the Dharang at about 1300 ft and 1 on the Hasta Khola at a similar elevation) but tracks indicated that gaur were present in greater numbers than in the Churias further west or on the Surung Khola in the Someswars within the park. Systematised counts carried out during the same season would be needed to quantify this impression.

It is difficult, at least to the unpractised eye, to distinguish gaur tracks from those of domestic stock, even when gaur tracks have been positively identified and studied by observation of the animal. Only large gaur tracks remain discernible among the confusion of hoof prints where stock has been herded. Thus positive records of gaur were mostly obtained from the higher reaches of the Hasta and Dharang Rivers where cattle had not been recently present.

Birdlife

Not noticeably distinct from the avifauna of the park and the only bird recorded which is not listed in the Chitwan park check list was the white crested laughing thrush (Garrulax leucolophus) which was seen on the Hasta Khola. Peafowl were recorded on the Dharang Khola but appeared to be less common than within the park.

3.3 Land Use and Human Impact

North of the Churias, on the Rapti flood plains, the settlements consist mainly of old-established villages whose farms are more or less contiguous as far east as Amrita with only isolated forest chowkis (eg Kahendramali) east of this. In contrast, south of the Churias, between Amwa and Shikaribas, settlements (such as Deepak Nagar two miles or so east of Amwa) are new and rapidly expanding. Hundreds of dwellings have been built within the sal forest and for several miles to the south-east of Amwa the forest is in the process of being cleared and burned. Tree stumps still stand in the ploughed and planted fields.

From these settled areas domestic stock is herded for miles up the Dharang and Hasta Rivers to graze the riverside flats. Simple

barrier fish traps are constructed on almost every division of the water channels.

Tyre marks revealed that trucks and jeeps are able to negotiate the dry watercourses for two or more miles north of Shikaribas, and in the case of the Hasta Khola, for half a mile or so along both major streams above their confluence i.e. for over five miles from the mouth of the river. The vehicles were being used to carry bamboo from the forest and cut canes were found stacked along the river awaiting transport. Clearly there would be opportunities for poaching and on the Dharang Khola it is difficult to imagine any other reason for driving up the river bed, there being no bamboo, and timber being more readily available elsewhere.

3.4 Recommendations

This brief survey was enough to show that the generally higher section of the Churias east of the present park boundary contains an interesting range of habitat types which will contribute significantly to the ecological diversity of the park. The steep cliffs, tall bamboo belts and curiously mixed pine/sal forest are conspicuous components of this part of the Churias but are much less so a few miles further west. The area supports a wide spectrum of wildlife and, in particular, has obvious potential for increasing the population of gaur within the park. In this respect, as an extension, it would compliment the western region where other species are to be specially considered.

Access from the existing park presents no great problem as has been pointed out; and at least above the footslopes, there is no appreciable human impact. Land use practices, such as there are, ought not to present any great problems of control.

From the visitors' viewpoint there are considerable possibilities for opening up trekking routes with overnight camps on permanent, clear streams. Distances involved are not great and by following streams the rugged terrain is not too difficult to traverse. Recommendations are put forward as follows:

1. As a first step the park should be extended eastwards as indicated on Map 6, the extension joining the existing boundary at Amwa and south of Bhimpur. This would extend the park by about 88 square miles (227 sq.km.) and could be done immediately without involving permanent settlements. The possibility of opening a motor track half a mile or so south of the escarpment on the southern leg of the extension should be explored. This would create a clear, definite boundary and would facilitate access and patrolling. Similarly, a motor track below the northern footslopes would serve the same dual function on the northern leg of the extension. If this should prove impracticable then the escarpment on the south side and a suitable contour on the north side will have to be selected.

2. Secondly the problem of resettlement of the people living south of the Rapti between Amrita and the existing north-eastern boundary of the park should be investigated and as a top priority the inhabitants of the Jaimangela - Padampur - Bhimpur - Piparaya complex of villages (forming a salient within the park) should be resettled elsewhere. The boundary should then be continued northwards to the Rapti River east of Bhimpur and Piparaya as drawn on Map 6. This would enclose a further four square miles (10 sq.km.) approximately, and create a compact park boundary enclosing (together with the proposed western extension) a total park area of some 354 square miles (917 sq.km.).

3. It might be necessary to resettle the inhabitants of the Jaimangala salient further east towards Kahendramali but resettlement of people, even from this relatively small area, will need to be handled with caution and a detailed feasibility study of the operation is an essential prerequisite. Numerous social, agricultural and economic factors will have to be quantified and the scheme will need to be fitted into the overall land-use plan for the region.

If it should prove possible to remove all the villages as far east as Amrita and resettle them outside the area altogether then the ideal boundary revision would become possible and should certainly be followed through. This would be to take the Rapti River as the northern boundary of the park from the Hasta Khola westwards to the existing boundary north of Bhalu Jungle Tappu (an additional 24 sq. miles approximately to the area shown on Map 6). The Rapti would thus form the northern boundary from the Hasta Khola westwards to the confluence with the Narayani. This final phase could be managed in stages (see 4 below).

4. Initially the eastern extension would come under the administrative control of Sauraha District Headquarters and guard posts should be established on the Hasta Khola near the northern boundary and on the Dharang Khola near the southern boundary. Later, if more outposts were found to be necessary between Hasta and Sauraha and between Dharang and Amwa, then the extension would need to be given separate Administrative District status with headquarters based on the Dharang north of Shikaribas.

4. DISCUSSION AND CONCLUSIONS

The proposed western extension needs no further comment. The boundaries are the obvious ones and any other arrangement could only be more difficult to manage and offer no possible gain to the park.

In the case of the eastern extension the question of human pressures and crop protection immediately comes to the fore and the problem needs to be considered.

In the south the boundary follows a steep, in parts precipitous, section of the Churias which represents a natural ecological barrier between the rugged range and the forested plains. South of the boundary a wide (2 to 3 miles) belt of forest remains as a buffer zone between the park and the present limit of cultivation. Provided they do not totally destroy this, the villagers will still be free to collect certain forest products, fuel-wood, building poles etc. Control of crop raiders (wild boar will be the worst offenders) could also be focused in this zone without infringement of the park bye-laws. Even controlled sport hunting might be considered. There are no rhino in this locality.

The northern leg of the extension presents latent problems. It was stated above (3.4) that, after the Jaimangala salient has been included, the land further east should be procured for the park if possible. However there are reasons to believe that the people within the salient will be more easily resettled than those further east. Annually the land within the salient is flooded and sections of it are being washed away. In recent years the threat of even more serious destruction has been greater with each successive monsoon. Information from the most reliable sources indicates that the villagers involved will be more than ready to move elsewhere.

When cost estimates and other factors are known a policy decision will clearly be needed as to whether the villages east of the salient are to be resettled at all. If so, then the park boundary should, in the interim, be amended so as to skirt the villages to the south and run northward to join the Rapti east of Amrita, continuing along the Rapti, to the Hasta Khola. If not, and the land to the east must be used for resettlement or other purposes, then the boundary should remain as shown on Map 6.

The most important measure is to procure the Jaimangala salient as soon as possible for by resettling the villagers at present within the salient the most troublesome section of the present boundary will be shortened from some nine miles to about $2\frac{1}{2}$ miles. The additional four square miles of land thus acquired will rapidly revert to floodplain grassland and the importance of this area for conservation would be hard to overestimate.

It is hoped that substantial funds will become available from the Conservation Coin Scheme. It would be difficult to imagine a more worthy use for it than the extension of Chitwan through the acquisition of valuable wildlife habitat containing, among many other species, tiger, rhino, gaur and gharial.

Appendix I

Time Schedule and FinanceTime Schedule

It is considered that a detailed time schedule would be of little value here in view of the uncertainty of future revenue and staff recruitment and the irregular availability of building materials. Certain items of the plan however should plainly be given priority even if development has to proceed somewhat opportunely and the warden, in drawing up his annual development programmes, will take this into account.

In general the basic infrastructure of the park, so essential to further development and progress, will need to be given top priority during the first and second years. The guard training scheme and basic research programme can not be started too early. The Conservation Education Centre on the other hand should be established later in the plan and in any case will need to be financed by outside aid which will take time to raise. The costs of the Conservation Education Centre have not therefore been included in the estimates below.

Estimated Expenditure (Costs as of January 1975)Capital Expenditure Over Five Years

Item	N.C. Rupees
a. Roads, paths and airstrips	
32 miles of new, all-weather road	160 000
10 miles of surface improvement	20 000
20 miles of motorable tracks	40 000
35 miles of inspection paths	7 000
Improvement of existing bridges	40 000
b. Building and Other Construction	
Ecologists' house and laboratory	250 000
5 senior staff quarters Kasra Durbar	250 000
2 guard officer's quarters	80 000
Accommodation for 30 junior staff	120 000
Canteen and store	7 000

Carpenters shop	6 000
Power house	2 000
2 hatisars	30 000
Boat house	1 000
2 gaols each for 4 prisoners (Koria Mohan & Kasra)	20 000
Accommodation for assistant warden (Sauraha)	80 000
Accommodation for 12 junior staff (Sauraha)	48 000
2 office/stores (Koria Mohan and Sauraha)	30 000
Garage, petrol and oil store (Sauraha)	10 000
2 camp sites with latrines/ablutions (Koria Mohan & Sauraha)	4 000
8 new guard posts	160 000
c. Transport	
1 Land-Rover pickup	42 000
1 3-ton truck	75 000
1 tractor with trailer and attachment	72 000
1 motor launch and motor	10 000
15 bicycles	10 000
d. Uniforms and Personal Equipment	
Uniforms/equipment as listed in table III for 130 men	150 000
Additional equipment for anti-poaching unit	10 000
80 twelve-bore shotguns and 2000 rounds ammunition	100 000
25 pairs 8x30 binoculars	5 000
5 pistols for senior staff	5 000
e. Miscellaneous Fitting, Equipment and Other Items	
Ecological laboratory furniture and apparatus as listed in table II together with Stevenson screen and standard meteorological instruments	21 000
Sign posts and markers for nature trails	5 000
Radio transceiver sets (3 additional for Div. Hqs.)	10 000

Tools and spares for garage	15 000
Typewriters (3 additional)	<u>2 500</u>
Total estimated Capital Expenditure over 5 years	<u>1 897 500</u>

Recurrent Expenditure (per annum)

Item	N.C. Rupees
a. Staff Salaries (based on government rates)	
Warden (gazetted Technical Officer Grade II)	10 296
Assistant Wardens (gaz. Tech III) (2)	15 048
Senior Guard Officer	7 956
Subedars (7)	38 367
School teacher	5 000
Staff Ecologist Counterpart	10 296
Medical Assistant	4 290
Driver Mechanic	4 290
Drivers (4)	7 497
Boat Coxwain	1 874
Camp caretakers (2)	2 679
Carpenter	4 300
Storeman	1 782
Senior clerk	2 574
Accountant	3 861
Gate clerks (3)	5 346
Peons (4)	5 360
Havildars (25)	78 450
Guards/scouts (100)	295 980
b. Travel Expenses for Staff	12 000
c. Maintenance of Vehicles	15 000

d. Petrol and Lubricants	40 000
e. Medical Supplies	1 000
f. Office Stationary etc	1 500
g. Publications	8 000
h. Maintenance of Buildings	10 000
i. Maintenance of Roads, Tracks and Bridges	20 000
j. Laboratory and Research	<u>6 000</u>
Total	<u>618 746</u>

Total Estimated Recurrent Expenditure

over 5 years

3 093 730

Total Estimated Capital Expenditure

over 5 years

1 897 500

GRAND TOTAL

4 991 230

Appendix IIBoundary Description of Royal Chitwan National Park

Starting at the confluence of the Narayani and Rapti Rivers.

Eastwards following the deepest channel of the Rapti River to the western end of Bhalu Jungle Island.

Thence following the northern shore of the island to its eastern end and thence due south to the deepest channel of the Rapti River.

Thence following the deepest channel of the Rapti River round the southern and western shores of Bhalu Jungle Island to a point about a quarter of a mile south of the island's western end.

Thence westwards to the bank of the Rapti and following a line of markers westwards for about one mile then southwards and eastwards to a marked pillar on the Mulkhola near Bhimpur.

Thence following the Mul Khola southwards for about half a mile, thence following a cleared trace to the Paire Khola.

Thence following the Paire Khola southwards to within a mile of the crest of the Churia ridge.

Thence following the footpath to Amwa as far as the pass at the crest of the ridge.

Thence eastwards along the crest of the ridge.

Thence eastwards along the crest of the ridge to the headwaters of Amwa Khola's western branch.

Thence southwards along the Amwa Khola to the Thori-Madi track.

Thence westwards along the Thori-Madi track to the Babai chowki on the Reu River.

Thence following the Reu River westwards to Bote Simra Chowki.

Thence following a line of markers westwards to Bote Simra Chowki.

Thence following a line of markers westwards to a point on the

Reu River.

Thence following the Reu River westwards to the first of a line of markers.

Thence following the line of markers southwards to Cheinpur village of the Dozar Khola.

Thence following the Dozar Khola along the adjacent footpath to India to the Nepal-India border.

Thence following the Nepal-India border westwards along the crest of the Churias to border pillar no. 60.

Thence continuing westwards along the crest of the ridge to the headwaters of the Mohan Khola.

Thence following the Mohan Khola downstream to the Narayani River.

Thence crossing the Narayani and following the deepest channel of its westernmost branch as far as Sikrauli.

Thence crossing the single channel of the Narayani at Sikrauli and following the deepest channel of its most easterly branch downstream to the confluence with the Rapti.

Boundary Revisions1. Proposed Western Extension

From the fifth paragraph from the end of the existing description continue thus:

Thence following the Nepal-India border westwards along the crest of the Churias to the headwaters of the Mohan Khola.

Thence following the Nepal-India border southwards and westwards to the confluence of the Panchnad and Narayani Rivers opposite the town of Tribenighat.

Thence following the east (left) bank of the Narayani in a northerly and then easterly direction to the mouth of the Mohan Khola some six miles west of the Rapti-Narayani confluence.

Thence crossing the Narayani and following the deepest channel of

its westernmost branch as far as Sikrauli.

Thence crossing the single channel of the Narayani at Sikrauli and following the deepest channel of its most easterly branch downstream to the confluence with the Rapti.

2. Proposed Eastern Extension

Once the Jaimangala cultivation area has been included in the park the eastern extension may be described as follows, beginning with paragraph three of the existing description:

Thence following the northern shore of the island to its eastern end and thence due south to the south bank of the Rapti River.

Thence following a line of markers in a southerly direction to a point on the Paire Khola.

Thence following a cleared track eastwards to the Hasta Khola.

Thence crossing the Hasta Khola and following its western bank southwards to the confluence of its two major tributaries.

Thence following the deepest channel of the eastern tributary to its most southerly headwaters at the crest of the Churia range.

Thence following a line of markers to the nearest headwaters of the Dharang Khola.

Thence following the deepest channel of the Dharang headwaters southwards to a marker about a mile south of the Churias most southern escarpment.

Thence following a cleared trace south of the said escarpment to Amwa.

Thence southwards along the Amwa Khola to the Thori-Madi track. (Paragraph 10 in existing description)

Appendix III

Chitwan Park Rules

Nepal Gazette

Published By His Majesty's Government

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Ministry of Forests

The following Royal Chitwan (sic) National Park Rules, 1974, framed by His Majesty's Government, are published for the information of the public.

Royal Chitwan National Park Rules, 1974

In exercise of the power conferred by Section 33 of the 1972 National Parks and Wild Life Protection Act, His Majesty's Government has framed the following rules:

1. Short Title and Commencement

(1) These rules may be called the Royal Chitwan National Park Rules, 1974.

(2) These rules shall come into force at once.

2. Definitions

Unless otherwise meant with reference to the subject or context, in these rules:

(a) Act means the 1973 National Parks and Wild Life Protection Act.

(b) Park or National Park means the Royal Chitwan National Park.

(c) Warden means the Chief Officer of the National Park appointed by His Majesty's Government.

3. Boundaries of National Park

The boundaries of the National Park shall be as declared by His Majesty's Government by notification in the Nepal Gazette under

Section 3 of the Act.

4. Entry Into Park

- (1) Any person desirous of entering into the Park shall pay the fees prescribed in Schedule 1. The person paying such fees shall be given a pass by the warden or any other employee designated by His Majesty's Government for the purpose.
- (2) Notwithstanding anything contained in Sub-Rule (1), persons enjoying movement facility under Rule 19 shall not be required to pay any fees for movement through the Park with the consent of the concerned entry post.
- (3) The warden may grant free entry to teams of any educational or other institution desirous of making a study tour of the Park.

5. Entry Into Park To Be On Personal Responsibility

In case any person entering into the Park with or without a pass suffers any damage or loss, or sustains any injury, or dies within the Park, His Majesty's Government shall bear no liability to pay compensation for such damage, loss, injury or death.

6. Actions Prohibited Inside Park

No person shall perform any of the following actions inside the Park without the written permission of the warden or any other employee empowered by His Majesty's Government for the purpose:-

- (a) Construct or use houses, huts, shelters or any other structure of any type.
- (b) Occupy, reclaim or cultivate any land.
- (c) Graze or feed any domestic animal or bird
- (d) Cut off, fell, remove, block or prune any tree, plant, bush or any other forest produce, or do anything that leads to their drying up, or set on fire or otherwise damage forest produce.
- (e) Spend nights or encamp at places other than those reserved for encamping.
- (f) Make a fire at places other than those reserved for encamping or those prescribed by the warden.
- (g) Carry or drive any domestic animal or bird through routes or places other than those specified under Rule 19.

7. Objects Possession or Carriage of Which is Forbidden

No person shall possess or carry the following objects while entering into or remaining inside the Park, or moving through routes specified under Rule 19, without the written permission of the warden:-

- (a) Arms or ammunition
- (b) Explosives or explosive devices
- (c) Trophy or dry or fresh meat of any wild animal
- (d) Bows and arrows, traps, nets or poison

8. Liability

In case any person causes loss to plants, bushes or any other object within the Park by starting a fire from within or outside the Park, he shall be liable for such loss.

9. Prohibition to Hunt and Remove or Destroy Bird's Nest

Except in circumstances in which permission has been received under the Act for the collection of samples for the purposes of work which is in the interest of the Park, or for the purpose of scientific research, no person shall hunt, kill, catch, chase, terrify or injure any wild animal or bird or remove, destroy or disturb the egg or nest of any bird within the park without the written permission of the warden.

10. Permission to be Obtained for Fishing

- (1) Fishing may be allowed on the streams or ponds situated within the park only subject to the conditions stipulated by the warden or any other employee designated by His Majesty's Government for the purpose, and on payment of the fees prescribed in Schedule I.
- (2) Notwithstanding anything contained in Sub-Rule (1), persons living in the periphery of the Rapti, Narayani and Reu Rivers which form the boundaries of the park may engage in fishing therein subject to the terms and conditions stipulated by the warden.

11. Prior Approval of His Majesty's Government to be Obtained

- (1) No person shall search for, excavate or remove earth, stone, sand or any other mineral within the park without the approval of His Majesty's Government.
- (2) In case any person desires to engage in any research work

within the Park, he may do so with the approval of His Majesty's Government. In such case, he shall be required to submit one copy of his report regarding such research.

12. Prohibition to Affix or Maintain Advertisements

No person shall display or maintain any sign-board, notice-board, advertisement, or any similar other poster within the Park other than at hotels, lodges, or other places of commercial activities opened within the Park under the Act.

13. Prohibition to Use Musical Instruments

Nobody shall switch on radios and tape-recorders or use any other musical instrument at any place within the Park other than at hotels, lodges, or similar other places established within the Park.

14. Prohibition to Throw Rubbish

No person shall make or throw rubbish inside the Park.

15. Prohibition to Throw Poisonous Substances

No person shall throw any poison or chemical which kill insects, intoxicants or poisonous substances inside or at the Park from outside, or drop the same on rivers, streams or any other source of water flowing through the Park, or otherwise place such poisonous substances in such a way that they reach the Park.

16. Conditions to be Followed While Driving Inside Park

A person shall drive vehicles within the Park subject to the following conditions:-

- (a) The weight of the vehicle shall not exceed 5 tons.
- (b) The vehicle shall not be driven or parked in such a manner as to obstruct the movement of other means of transport, pedestrians or any other object.
- (c) The vehicle shall not be driven in excess of the prescribed speed limit, and the horn too shall not be sounded.
- (d) The vehicle shall not be driven through any route which has been closed to traffic under Sub-Rule (3) of Rule 19.

17. Signals to be Obeyed

All drivers shall drive their vehicles within the Park according to the signals or directions given by the employee of the Park, or according to the billboards maintained as such signal or direction.

18. Restrictions on Movement

Nobody shall enter into or move through any place within the park between 6:00 P.M. and 6:00 A.M. without the written permission of the warden, except in hotels, lodges or any prescribed camp.

19. Movement Facility

- (1) The facility of moving on foot or through means of transport within the park through the routes prescribed in Schedule 5 shall be provided.
- (2) The routes mentioned in Sub-Rule (1) shall be used only through the places marked by the warden. In no circumstances shall any person deviate from such routes and use different one without the written permission of the warden.
- (3) Notwithstanding anything contained in Sub-Sections (1) and (2), in case the warden deems it appropriate to close any such route at times of bad weather, he may do so till the weather improves.

20. Payment of Fees

- (1) Fees as prescribed in Schedule 1 shall be paid in consideration of the following:-
 - (a) Driving
 - (b) Encamping
 - (c) Use of services for guides of the Park
 - (d) Carrying domestic animals
- (2) Every person paying fees under Sub-Rule (1) shall be issued a receipt in the form indicated in Schedule 4.

21. Seizure of Means of Transport or Animal

In case any person is found to have taken any means of transport or domestic animal through routes inside the Park other than those in respect to which facility has been granted under these rules, such means of transport or animal shall be seized by the Park's employee of the rank prescribed by the warden and handed over to the appropriate authority for necessary action.

22. Power to Arrest

- (1) The Assistant Warden, Forest Guards or other employees of the Park may, after obtaining warrants from the Warden, arrest any person on the charge of having acted in contravention of the Act, or search his belongings or means of

transport.

- (2) Notwithstanding anything contained in Sub-Rule (1), in case any accused person is likely to run away he may be arrested or his belongings or means of transport may be searched, without any warrant.

23. Exemption in Case of Entry for Official Purposes

Nothing contained in these rules shall be deemed to have affected the right of any employee of the National Park or of any other government office to enter into the Park at any time to carry out any official business according to the orders of his office.

24. Power to Amend Schedule

His Majesty's Government may, if it so deems necessary, effect amendments in the schedules to these rules by notification in the Nepal Gazette.

25. Authorities Competant to Hear Cases

- (1) The power to dispose of cases relating to offenses mentioned below shall vest in the Assistant Warden, where there is one, or else in the Ranger:
- (a) Irregular removal, cutting or lifting of forest produce worth no more than Rs100.00
 - (b) Entry into the Park without pass or permission
 - (c) Grazing or feeding of domestic animals inside the Park
 - (d) Overnight stay, encamping, or burning of fire at places other than those reserved for encampment or those prescribed by the warden.
 - (e) Taking of domestic animals through routes other than the prescribed ones.
 - (f) Fishing in contravention of Rule 10
 - (g) Affixature or maintenance of any sign-board, bill-board, advertisement or poster in contravention of Rule 12.
 - (h) Playing of any musical instrument in contravention of Rule 14
 - (i) Making of rubbish in contravention of Rule 14
 - (j) Driving of vehicles, or exceeding the speed-limit, or disregarding signals in contravention of Rule 16
 - (k) Entry into or movement within the Park between 6:00 P.M. and 6:00 A.M. without permission.

- (l) Driving of vehicles in contravention of Rule 17
 - (m) Movement through any route or place in contravention of Rule 19
- (2) The power to dispose of cases relating to the following offenses shall vest in the warden:
- (a) Destruction, damage or removal or any other kind of loss to the boundaries, signs, fences, walls, sign-boards or notices of the Park
 - (b) Action which contravenes Clauses (a), (b) and (c) of Rule 6, or cutting, felling, removal or lifting of or otherwise causing damage to any tree, plant or any other forest produce worth more than Rs100.00
 - (c) Taking any material inside the Park in contravention of Rule 7
 - (d) Causing damage to any plant or bush by setting it on fire inside or from outside the Park
 - (e) Hunting of birds within the Park or removal, damage or destruction of eggs or nests in contravention of Rule 9.
 - (f) Digging any mineral or shifting or removing stone, sand, earth, boulders or similar other materials in contravention of Rule 11.
 - (g) Spraying, dropping or throwing insecticides or poisonous substances in contravention of Rule 15
- (3) The power to dispose of cases relating to offences other than those mentioned in Sub-Rules (1) and (2) shall vest in the Conservator of the Chitaur Forest Division Office.

Schedule I

(Pertaining to Rules 4, 10 and 20)

(a) <u>Fees for Entry Into the Park</u>	<u>Fees per entry for every person</u>
For Nepali citizens	Rs 5.00
For Foreigners	Rs20.00
For children aged between 5 and 12 years	Half of the above fees
For children aged below 5 years	Free

(b) Fees for Means of Transport (in the case of routes for which route facility is available or any other route)

Cars, jeeps	Rs 10.00
Lorries, buses, tractors and trucks of weight not exceeding 5 tons	Rs 15.00
Carts driven by buffaloes or bullocks	Rs 1.00

(c) Camping Fee for Each Night

For Nepali citizens	Rs 2.50
For Foreigners	Rs10.00
For children aged between 5 and 12 years	Half of the above fees
For children below 5 years	Free

(d) Fees for Guide Services Rs20.00 per day for every guide

(e) Fees for Carrying Domestic Animals Through Routes for Which Movement Facility is Available Within The Park

Elephant	Rs2.00 each
Buffaloes (both males and females) cows, oxen, horses and mules	Rs0.25 each
Sheep, goats, dogs, pigs and similar other domestic animals	Rs0.10 each

(f) Fishing Fees

For Nepali citizens	Rs5.00 per day
For Foreigners	Rs10.00 per day

Schedule 2

(Pertaining to Rule 5)

His Majesty's Government
 Royal Chitau National Park
 National Park and Wild Life Protection Office
 Ministry of Forests

Name and Address:.....Serial No.....

Age.....

Citizenship.....

Entry Fee.....

Signature of the person
 accepting the fee

Note: Every person entering the Park shall comply with the 1974 Royal Chitau National Park Rules

Schedule 3

(Pertaining to Rule 10)

His Majesty's Government
 Royal Chitau National Park
 National Park and Wild Life Protection Office
 Ministry of Forests

Permit

1. Name of recipient of the permit.....Serial No.....

2. Address.....

(a) Permanent.....

(b) Temporary.....

- 3. Nationality
- 4. Description of the stream or pond or portion thereof on which fishing is permitted
- 5. Day or period for which the permit is to be valid
- 6. Permit fee paid

Signature of authority issuing permit

Designation

Date

Note: The person obtaining this permit shall engage in fishing subject to the conditions prescribed by the warden or the employee designated by His Majesty's Government for the purpose

Schedule 4

(Pertaining to Rule 20)
 His Majesty's Government
 National Parks and Wild Life Protection Office
 Royal Chitaun National Park

Receipt Against Payment of Fees for Vehicles and Domestic Animals

Name

Category of vehicle or domestic animal

Vehicle number

Fee

Signature of payer

Signature of receiver of the fee

Note: (1) This receipt shall be handed over to theor post at point of exit from the National Park

(2) Every person driving a vehicle or carrying any domestic animals through the Park shall comply with the 1974 Royal Chitaun National Park Rules

Schedule 5

(Pertaining to Rule 19)

(a) Routes open for vehicles and pedestrians

- | | |
|---------------|-------------|
| 1. Soraha | Jayamangala |
| 2. Ghatgai | Pauwa |
| 3. Dhruhaghat | Bankatta |
| 4. Bhosarghat | Lokhani |

(b) For pedestrians only:-

Bhimpur, Sisnethanti Amuwa

By Order,

Thir Bahadur Raimajhi
 Secretary to HMG

Appendix IV

Preliminary Check List of Mammals of Chitwan National Park

INSECTIVORA

Grey musk shrew Suncus murinus
 Malay tree shrew Tupaia glis
 (one record: C McDougal)

PRIMATES

Rhesus macaque Macaca mulatta
 Common langur Presbytis entellus

CARNIVORA

Jackal Canis aureus
 Indian wild dog Cuon alpinis
 Indian fox Vulpes bengalensis
 Sloth bear Melursus ursinus
 Himalayan black bear Selenarctos thibetanus
 (one record J E Blower: probably not resident)
 Smooth Indian otter Lutra perspicillata
 Yellow-throated martin Martes flavigula
 (one record: C McDougal)
 Spotted linsang Prionodon pardicolor
 (recorded Sauraha area: Sunquist & Tamang)
 Large Indian civet Viverra zibetha
 (one record: C McDougal)
 Common palm civet Paradoxurus hermaphroditus
 (uncertain record)
 Common mongoose Herpestes edwardsi
 Crab-eating mongoose Herpestes urva

Striped hyaena
 Jungle cat
 Fishing cat
 Leopard
 Tiger

Hyaena hyaena
Felis chaus
Felis viverrina
Panthera pardus
Panthera tigris

CETACEA

Gangetic dolphin

Platanista gangetica

PROBOSCIDAE

Elephant

Elephas maximus

PERISSODACTYLA

Great one-horned rhinoceros

Rhinoceros unicornis

ARTIODACTYLA

Gaur
 Wild boar
 Barking deer
 Hog deer
 Chital
 Sambar

Bos gaurus
Sus scrofa
Muntiacus muntjak
Axis porcinus
Axis axis
Cervus unicolor

RODENTIA

Five-striped palm squirrel
 Large flying squirrel
 (one record: C McDougal. Probably P.p. albiventor)
 Indian mole rat
 Indian porcupine
 House rat

Funambulus pennanti
Petaurista petaurista
Bandicota bengalensis
Hystrix indica
Rattus rattus

LAGOMORPHA

Indian hare

Lepus nigricollis

Appendix V

Preliminary Check List Of The Birds Of Chitwan National Park

From the records of :

Robert L Fleming Sr.
Robert L Fleming Jr.
Charles Mc Dougal

PODICIPITIDAE

<u>Podiceps ruficollis</u>	Little grebe
<u>Podiceps cristatus</u>	Great crested grebe

PHALACROCORIDAE

<u>Phalacrocorax carbo</u>	Cormorant
<u>Phalacrocorax niger</u>	Pigmy cormorant
<u>Anhinga rufa</u>	Darter

ARDEIDAE

<u>Ardea cinerea</u>	Grey heron
<u>Ardea purpurea</u>	Purple heron
<u>Butorides striatus</u>	Little green heron
<u>Ardeola grayii</u>	Pond heron
<u>Bubulcus ibis</u>	Cattle egret
<u>Egretta alba</u>	Large egret
<u>Egretta intermedia</u>	Middle egret
<u>Egretta garzetta</u>	Little Egret
<u>Nycticorax nycticorax</u>	Night heron

CICONIIDAE

<u>Ibis leucocephalus</u>	Painted stork
<u>Anastomus oscitans</u>	Openbill stork
<u>Ciconia episcopus</u>	Whitenecked stork
<u>Ciconia nigra</u>	Black stork

Xenorhynchus aslaticus
Leptoptilos javanicus

Blacknecked stork
Lesser Adjutant stork

THRESKIORNITHIDAE

Pseudibis papillosa

Black ibis

ANATIDAE

Anser indicus
Dendrocygna javanica
Tadorna ferruginea
Anas platyrhyncha
Anas crecca
Dafilla acuta
Anas poecilorhyncha
Anas penelope
Aythya ferina
Aythya fuligula
Nettapus coromandolianus
Mergus merganser

Barheaded goose
Lesser whistling teal
Ruddy shelduck
Mallard
Common teal
Pintail
Spotbill duck
Widgeon
Common pochard
Tufted pochard
Cotton teal
Common merganser

ACCIPITRIDAE

Elanus caeruleus
Milvus migrans
Accipter badius
Spizaetus limnaetus
Aquila clanga
Ichthyophaga nana

Blackwinged kite
Fariah kite
Shikra
Changeable hawk eagle
Greater spotted eagle
Himalayan grey-headed fishing eagle
Black vulture
Griffon vulture
Longbilled vulture
Whitebacked vulture
Scavenger vulture
Marsh harrier

Torgos calvus
Gyps fulvus
Gyps indicus
Gyps bengalensis
Neophron percnopterus
Circus aeruginosus

Spilornis cheela
Pandion haliaetus

FALCONIDAE

Microhierax caerulescens
Falco tinnunculus
Falco peregrinus

Crested serpent eagle
Osprey

Redlegged falconet
Kestrel
Peregrine falcon

PHASIANIDAE

Francolinus francolinus
Lophura leucomelana
Gallus gallus
Pavo cristatus

Black partridge
Kalij pheasant
Red junglefowl
Peafowl

TURNICIDAE

Turnix suscitator

Common bustard quail

GRUIDAE

Anthropoides virgo

Demoiselle crane

RALLIDAE

Porsana pusilla
Amaurornis akool
Porphyrio porphyrio
Amaurornis phoenicura
Gallinula chloropus
Fulica atra

Baillon's crake
Brown crake
Purple waterhen
White breasted waterhen
Waterhen
Coot

OTIDIDAE

Chloriotis nigriceps
Eupodotis bengalensis

Great Indian bustard
Bengal florican

JACANIDAE

Metopidius indicus
Hydrophasianus chirugus

Bronzewinged jacana
Pheasant-tailed jacana

CHARADRIIDAE

Vanellus indicus
Vanellus spinosus
Charadrius dubius
Charadrius alexandrinus
Tringa nebularia
Tringa ochropus
Tringa glareola
Tringa hypoleucos
Limosa limosa
Capella gallinago
Scolopax rusticola
Calidris temminckii

Redwattled lapwing
Spurwinged lapwing
Little ringed plover
Kentish plover
Greenshank
Green sandpiper
Wood sandpiper
Common sandpiper
Black tailed godwit
Fantail snipe
Woodcock
Temminck's stint

ROSTRATULIDAE

Rostratula benghalensis

Painted snipe

RECURVIROSTRIDAE

Himantopus himantopus

Black-winged stilt

BURHINIDAE

Burhinus oedienemus
Esacus magnirostris

Stone curlew
Great stone plover

GLAREOLIDAE

Glareola lactea

Small Indian pratincole

LARIDAE

Larus argentatus
Larus brunnicephalus
Larus ridibundus
Sterna aurantia
Sterna acuticauda

Herring gull
Brownheaded gull
Blackheaded gull
Indian river tern
Blackbellied tern

COLUMBIDAE

<u>Treron curvirostra</u>	Thickbilled green pigeon
<u>Treron pompadora</u>	Greyfronted green pigeon
<u>Treron phoenicoptera</u>	Bengal green pigeon
<u>Streptopelia decaocte</u>	Ring dove
<u>Streptopelia tranquebarica</u>	Red turtle dove
<u>Streptopelia chinesis</u>	Spotted dove
<u>Chalcophaps indica</u>	Emerald dove

PSITTACIDAE

<u>Psittacula eupatria</u>	Large Indian parakeet
<u>Psittacula krameri</u>	Roseringed parakeet
<u>Psittacula alexandri</u>	Rosebreasted parakeet
<u>Psittacula cyanocephala</u>	Blossomheaded parakeet
<u>Psittacula himalayana</u>	Slatyheaded parakeet

CUCULIDAE

<u>Glanator coromandus</u>	Redwinged crested cuckoo
<u>Cuculus varius</u>	Common hawk cuckoo
<u>Cuculus micropterus</u>	Indian cuckoo
<u>Surniculus lugubris</u>	Drongo cuckoo
<u>Rhopodytes tristis</u>	Large greenbilled Malkoha
<u>Taccocua leschenaultii</u>	Sirkeer cuckoo
<u>Centropus sinensis</u>	Crow pheasant

STRIGIDAE

<u>Tyto capensis</u>	Grass owl
<u>Otus bakkamoena</u>	Collared scops owl
<u>Bubo zeylonensis</u>	Brown fish owl
<u>Glaucidium radiatum</u>	Jungle owlet
<u>Ninox scutulata</u>	Brown hawk-owl
<u>Athene brama</u>	Spotted owlet

CAPRIMULGIDAE

<u>Caprimulgus indicus</u>	Jungle nightjar
<u>Caprimulgus macrurus</u>	Horsfield's nightjar
<u>Caprimulgus monticolus</u>	Franklin's nightjar

APODIDAE

<u>Hemiprocne longipennis</u>	Crested swift
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ALCEDINIDAE

<u>Ceryle rudis</u>	Lesser pied kingfisher
<u>Alcedo atthis</u>	Common kingfisher
<u>Alcedo mininting</u>	Blueeared kingfisher
<u>Pelargopsis capensis</u>	Storkbilled kingfisher
<u>Halcyon smyrnensis</u>	Whitebreasted kingfisher

CORACIIDAE

<u>Coracias benghalensis</u>	Indian roller
<u>Eurystomus orientalis</u>	Broadbilled roller

UPUPIDAE

<u>Upupa epops</u>	Hoopoe
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BUCEROTIDAE

<u>Anthracoceros malabaricus</u>	Indian pied hornbill
<u>Buceros bicornis</u>	Great pied hornbill

CAPITONIDAE

<u>Megalaima lineata</u>	Lineated barbet
<u>Megalaima asiatica</u>	Bluethroated barbet
<u>Megalaima haemacephala</u>	Crimsonbreasted barbet

PICIDAE

<u>Picumnus innominatus</u>	Speckled piculet
<u>Sasia ochracea</u>	Rufous piculet
<u>Picus xanthopygaenus</u>	Little scalybellied woodpecker

<u>Picus canus</u>	Blacknaped green woodpecker
<u>Picus chlorolophus</u>	Small yellownaped woodpecker
<u>Dinopium shorii</u>	Goldenbacked threetoed woodpecker
<u>Dendrocopos macei</u>	Fulvousbreasted pied woodpecker
<u>Dendrocopos canicapillus</u>	Greycrowned pigmy woodpecker
<u>Chrysocolaptes lucidus</u>	Crimsonbacked woodpecker
<u>Dryobates mahrattensis</u>	Mahratta (Yellow-fronted pied) woodpecker

PITTIDAE

<u>Pitta brachyura</u>	Indian pitta
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ALAUDIDAE

<u>Mirafra erythroptera</u>	Redwinged bush lark
<u>Eremopterix grisea</u>	Ashycrowned finch lark
<u>Calandrella raytal</u>	Sand lark

HIRUNDIDAE

<u>Riparia paludicola</u>	Plain sand martin
<u>Hirundo rustica</u>	Common swallow
<u>Hirundo daurica</u>	Striated swallow (Red-rumped swallow)

LANIDAE

<u>Lanius schach</u>	Blackheaded shrike
<u>Lanius cristatus</u>	Brown shrike
<u>Hemipus picatus</u>	Pied flycatcher shrike
<u>Tephrodornis virgatus</u>	Large wood-shrike
<u>Tephrodornis pondicerianus</u>	Common wood-shrike

ORIOOLIDAE

<u>Oriolus oriolus</u>	Golden oriole
<u>Oriolus xanthornus</u>	Blackheaded oriole

DICRURIDAE

<u>Dicrurus adsimilis</u>	Black drongo
<u>Dicrurus leucophaeus</u>	Grey drongo
<u>Dicrurus caerulescens</u>	Whitebellied drongo
<u>Dicrurus annectans</u>	Crowbilled drongo
<u>Dicrurus remifer</u>	Lesser racket-tailed drongo
<u>Dicrurus hottentottus</u>	Haircrested drongo
<u>Dicrurus paradiseus</u>	Greater racket-tailed drongo

ARTAMIDAE

<u>Artamus fuscus</u>	Ashy swallow-shrike
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STURNIDAE

<u>Sturnus malabaricus</u>	Greyheaded myna
<u>Sturnus contra</u>	Pied myna
<u>Acridotheres tristis</u>	Common myna
<u>Acridotheres ginginianus</u>	Bank myna
<u>Acridotheres fuscus</u>	Jungle myna
<u>Gracula religiosa</u>	Hill myna

CORVIDAE

<u>Dendrocitta vagabunda</u>	Indian tree pie
<u>Corvus macrorhynchos</u>	Jungle crow

CAMPEPHAGIDAE

<u>Coracina novaehollandiae</u>	Large cuckoo-shrike
<u>Pericrocotus flammeus</u>	Scarlet minivet
<u>Pericrocotus cinnamomeus</u>	Small minivet

IRENIDAE

<u>Aegithina tiphia</u>	Common iora
<u>Chloropsis aurifrons</u>	Goldfronted leaf bird

PYCNONOTIDAE

<u>Pycnonotus melanicterus</u>	Blackheaded yellow bulbul
<u>Pycnonotus jocosus</u>	Redwhiskered bulbul
<u>Pycnonotus leucogenys</u>	Whitecheeked bulbul
<u>Pycnonotus cafer</u>	Redvented bulbul
<u>Hypsipetes madagascariensis</u>	Black bulbul

MUSCICAPIDAE

<u>Pellorneum ruficeps</u>	Spotted babbler
<u>Pomatorhinus erythrogenys</u>	Rustycheeked scimitar babbler
<u>Stachyris pyrrhops</u>	Redbilled babbler
<u>Stachyris nigriceps</u>	Blackthroated babbler
<u>Macronous gularis</u>	Yellowbreasted babbler
<u>Pimelia pileata</u>	Redcapped babbler
<u>Chrysomma sinensis</u>	Yelloweyed babbler
<u>Turdoides earlei</u>	Striated babbler
<u>Turdoides striatus</u>	Jungle babbler
<u>Tarrulax moniigera</u>	Necklaced laughing-thrush
<u>Tarrulax ruficollis</u>	Rufousnecked laughing-thrush
<u>Yuhina zantholeuca</u>	Whitebellied yuhina
<u>Muscicapa ruficauda</u>	Rufoustailed flycatcher
<u>Muscicapa parva</u>	Redbreasted flycatcher
<u>Muscicapa poliogenys</u>	Brook's flycatcher
<u>Culicicapa ceylonensis</u>	Greyheaded flycatcher
<u>Rhipidura aureola</u>	Whitebrowed fantail flycatcher
<u>Terpsiphone paradisi</u>	Paradise flycatcher
<u>Cettia pallidipes</u>	Blandford's bush warbler
<u>Prinia socialis</u>	Ashy longtailed warbler
<u>Prinia sylvatica</u>	Jungle longtailed warbler
<u>Prinia flaviventris</u>	Yellowbellied longtailed warbler
<u>Ornhotomus sutorius</u>	Tailor bird
<u>Acrocephalus stentoreus</u>	Indian great reed warbler

<u>Acrocephalus agricola</u>	Paddyfield warbler
<u>Phylloscopus collybita</u>	Brown leaf warbler
<u>Phylloscopus inornatus</u>	Plain leaf warbler
<u>Phylloscopus trochiloides</u>	Dull green leaf warbler
<u>Phylloscopus reguloides</u>	Blyth's leaf warbler
<u>Seicercus burkii</u>	Blackbrowed flycatcher warbler
<u>Erithacus svecicus</u>	Bluethroat
<u>Erithacus pectoralis</u>	Himalayan rubythroat
<u>Copsychus saularis</u>	Magpie robin
<u>Copsychus malabaricus</u>	Shama
<u>Phoenicurus ochruros</u>	Black redstart
<u>Rhyacornis fuliginisus</u>	Plumbeous redstart
<u>Enicurus immaculatus</u>	Blackbacked forktail
<u>Saxicola torquata</u>	Collared bush chat
<u>Saxicola leucura</u>	Whitetailed bush chat
<u>Saxicola caprata</u>	Pied bush chat
<u>Zoothera citrina</u>	Orangeheaded ground thrush
<u>Turdus bouboul</u>	Greywinged blackbird
<u>Turdus ruficollis</u>	Blackthroated thrush

PARIDAE

Parus major

Grey tit

SITTIDAE

Sitta castanea
Sitta frontalis

Chestnutbellied nuthatch
Velvet fronted nuthatch

MOTACILLIDAE

Anthus hodgsoni
Anthus trivialis
Anthus novaeseelandiae
Motacilla flava
Motacilla caspica
Motacilla alba

Hodgson's tree pipit
Tree pipit
Paddyfield pipit
Yellow wagtail
Grey wagtail
White wagtail

<u>Motacilla maderaspatensis</u>	Large pied wagtail
DICAETIDAE	
<u>Dicaeum erythrorhynchos</u>	Tickell's flowerpecker
<u>Dicaeum ignipectus</u>	Firebreasted flowerpecker
NECTARINIIDAE	
<u>Nectarinia asiatica</u>	Purple sunbird
<u>Aethopyga siparaja</u>	Indian scarlet sunbird
<u>Arachnothera magna</u>	Streaked spiderhunter
ZOSTEROPIDAE	
<u>Zosterops palpebrosa</u>	White-eye
PLICEIDAE	
<u>Passer domesticus</u>	House sparrow
<u>Ploceus philippinus</u>	Baya weaver
<u>Estrilda amandava</u>	Red munia
<u>Lonchura punctulata</u>	Spotted munia
<u>Lonchura striata</u>	Striated munia
FRINGILLIDAE	
<u>Carpodacus erythrinus</u>	Common Rosefinch
EMBERIZIDAE	
<u>Emberiza aureola</u>	Yellowbreasted bunting
<u>Emberiza fucata</u>	Greyheaded bunting
<u>Melophus lathami</u>	Crested bunting

Appendix VI

Preliminary Check List Of Reptiles, Amphibians and Fishes

Many familiar reptiles, amphibians and fishes of Chitwan have yet to be identified. The following are known to occur:

<u>Reptiles:</u>	CROCODILIA	
Mugger		<u>Crocodylus palustris</u>
Gharial		<u>Gavialis gangeticus</u>
	SQUAMATA	
Common krait		<u>Bungarus coeruleus</u>
Green pit viper		<u>Trimeresurus albolabris</u>
Cobra		<u>Naja tripudians</u>
King cobra		<u>Naja elaps</u>
Indian python		<u>Python molurus</u>
Rat snake		<u>Pytas mucosa</u>
	CHELONIA	
Indian starred tortoise (identity to be confirmed)		<u>Testudo elegans</u>
<u>Amphibians:</u>	ANURA	
Common Indian toad *		<u>Bufo melanostictus</u>
Water skipping frog *		<u>Rana cyanophlyctis</u>
Saline frog *		<u>Rana limnocharis</u>
<u>Fishes:</u>		
Mahseer or Indian salmon		<u>Barbus tor</u>
Jalkapoor		<u>Barilius spp</u>

* Identity to be confirmed

Appendix VIIPreliminary Check List Of Plants

From the records of A Laurie

(For convenience genera are listed in alphabetical order)

Ferns

Helminthostachys zeylanica
Lygadium japonicum
Marsilia tetraphylla (aquatic)
Ophioglossum petiolatum
Pteris vittata

Reeds, Rushes and Sedges

Cyperus brevifolius
C. cyperoides
C. difformis
C. mersuri
C. niveus
C. rotundus
Fimbristylis dichotoma
Typha elephantina

Grasses

Aristida sp
Arundinella nepalensis
Arundo donax
Apluda mutica
Apluda sp
Brachiaria ramosa
Capillipedium assimile
Chrysopogon aciculatus
C. gryllus

Cymbopogon flexosus
C. pendulus
Cynodon dactylon
Dactyloctenium aegypticum
Demostachya bipinnata
Dendrocalamus strictus
Digitaria adscendens
D. setigera
Echinochloa crusgalli
Elusine indica
Eragrostis japonicus
E. tenella
E. unioloides
Hemarthria compressa
Imperata cylindrica
Ischaemum angustifolium
Narenga porphyrocoma
Paspalidium flavidum
Paspalum scrobiculatum
P. distichum
Phragmites karka
Pogonatherum crinitum
Polypogon monspeliensis
Saccharum procerum
S. ravenoe
S. spontaneum
Setaria pallida-fusca
S. plicata
Sporobolus diander
Themeda arundinaceae
T. caudata
T. villosa
Thryisia zea

Herbs (Forbs)

Ageratum conyzoides
Artemesia vulgaris .
Asparagus racemosus
Azuga sp
Caesulia oxilaris
Callotropis gigantea
Caryopteris wallichianum
Chenopodium album
Cirsium wallichii
Commelina bengalensis
Commelina sp
Crotalaria albida
Cynoglossum furcatum
Discorea sp
Eclipta prostrata
Erigeron lineifolius
Eupatorium odoratum
Euphorbia hirta
Gnaphalium luteo-album
Hydrilla verticella (aquatic)
Indigophera pulchella
Innula cappa
Ipomea quamoclit
Lemna perpusilla (aquatic)
Leucas zeylanica
Melothria mucronata
Moghania strobilifera
Monochoria hastifolia (aquatic)
Nasturtium indicum
Oenanthe sp
Oxalis corniculata
Pistia stratiotes (aquatic)

Polygala sp
Polygonum barbatum
P. plebujum
Potamegeton sp (aquatic)
Ranunculus scleratus
Remusatia sp
Rotala rotundifolia
Selinum tenuifolium
Swertia angustifolia
Solanum indicum
S. verbascifolium
Stellaria sp
Trigonella sp
Verbena officinalis
Yongia japonica

Shrubs

Adhatoda vasica
Caesalpina separia
Callicarpa macrophylla
Cassia tora
Clerodendron infortunatum
Colebrookia oppositifolia
Grewia hainesiana
G. sapida
G. sclerophylla
Lespedeza eriocarpa
Mallotus nepalensis
Mimosa pudica
Mussaenda macrophylla
Osbeckia sp
Pogostemon plectanthroides
Reinwarotia trigyna

Solanum xanthocarpumStrobilanthus nutasZiziphus jujubaTrees and Woody ClimbersAcacia catechuAcacia pennataAdina cordifoliaAegle marmelosAlnus nepalensisAtbizzia odoratissimaAlbizzia proceraAlstonia scholarisAnthocephalus cadambaAzadirachta indicaBauhinea malabaricumBauhinia vahliiBombax malabaricumBridelia retusaButea frondosaCassia fistulaCedrela toonaCitrus medicaCordia myxaCroton oblongifoliaDalbergia sissooDillenia indicaEhretia laevisEugenia jambolinaEugenia operculataFicus cuniaF. glomerulataF. religiosaF. roxburghiiGaruga pinnataGmelina arboreaGnetum spHolarrhena antidysentericaLagerstroemia parvifloraLannia grandisLitsaea polyanthaMacaranga indicaMallotus philipensisMiliusa velutinaMillettia auriculataMitragyna parvifloraMusa sapientumOugenia dalbergoidesPhyllanthus emblicaPinus roxburghiiPiper spRhus nepalensisSemecarpus anacardiumShorea robustaSpatholobus roxburghiiSterculia pallensS. villosaTerminalia belericaT. chebulaT. tomentosaTrewia nudifloraWendlandia tinctoriaXylosma longifolium

Appendix VIIISuggested Basic (minium) Equipment For Ecological Research
Laboratory: Chitwan

- 1 Analytical balance (200g- 1mg.)
- 1 Single pan balance (2000g- 10g)
- 1 Weights (general purpose) 10mg-200g
- 2 Drying oven (hot air) gas (30x30x30cm or larger) with thermometer
- 4 Bunsen burner (bottle gas)
- 4 Tripod and 12 wire gauzes
- 2 Glass desiccators (25cm dia) with silica gel
- 20 Porcelain crucibles with lids
- 4 Crucible tongs
- 1 Soil p.H. indicator
- 8 Measuring cylinders (2 each of 25, 50, 100, 200 cc.)
- 1 Small calculating machine
- 10 Pipettes 1,2,5 ml.
- 25 Small glass specimen jars
- 25 Small screw-top polythene jars (125-1000cc)
- 4 Pkt filter papers (15cm)
- 1 Planimeter
- 1 Compound microscope
- 1 Binocular microscope
- 1 Set air photographs of park
- 1 Stereoscope
- 1 35mm camera with standard and wide angle lens, separate light meter and black and white film
- 1 8x30 binocular
- 1 Set dissecting instruments
- 500 Sheets mounting paper for herbarium specimens

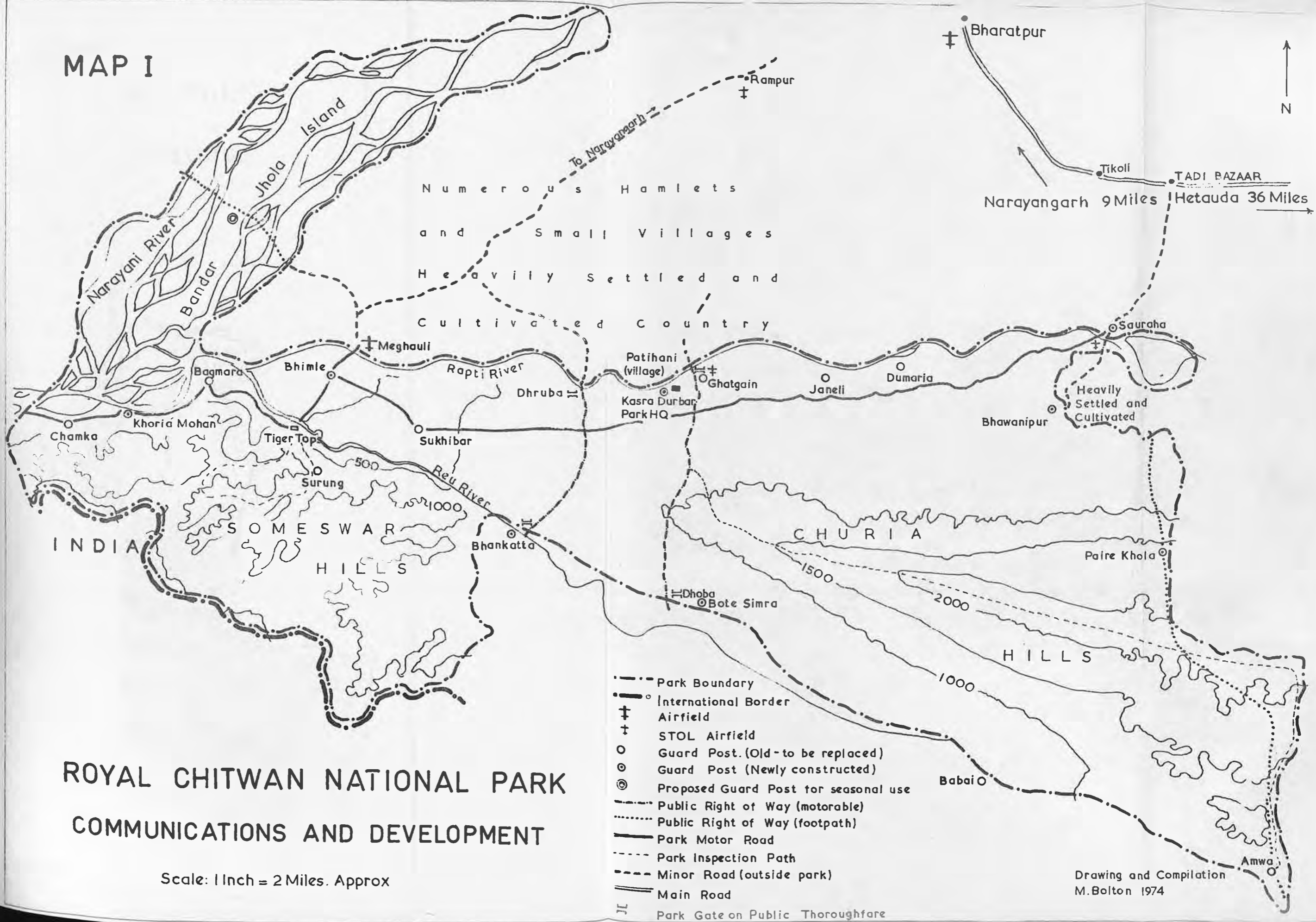
- 5 Litres alcohol (preservative)
- 5 Litres formaldehyde
- 1 Set simple office equipment eg files, stapler, scotch tape, tracing paper, paper clips, typewriter, mapping pens, felt pens, etc.
- 4 Plant presses
- 1 Each - spade, grass-cutting shears, soil auger, steel tape, diameter tape, tree auger
- 4 Thermometers - 10 C to 50 C
- 2 Tally counters
- 10 Small mammal traps (live capture)
- 100 Assorted polythene bags
- Reference books and maps

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MAP I



ROYAL CHITWAN NATIONAL PARK
COMMUNICATIONS AND DEVELOPMENT

Drawing and Compilation
M. Bolton 1974

MAP 3

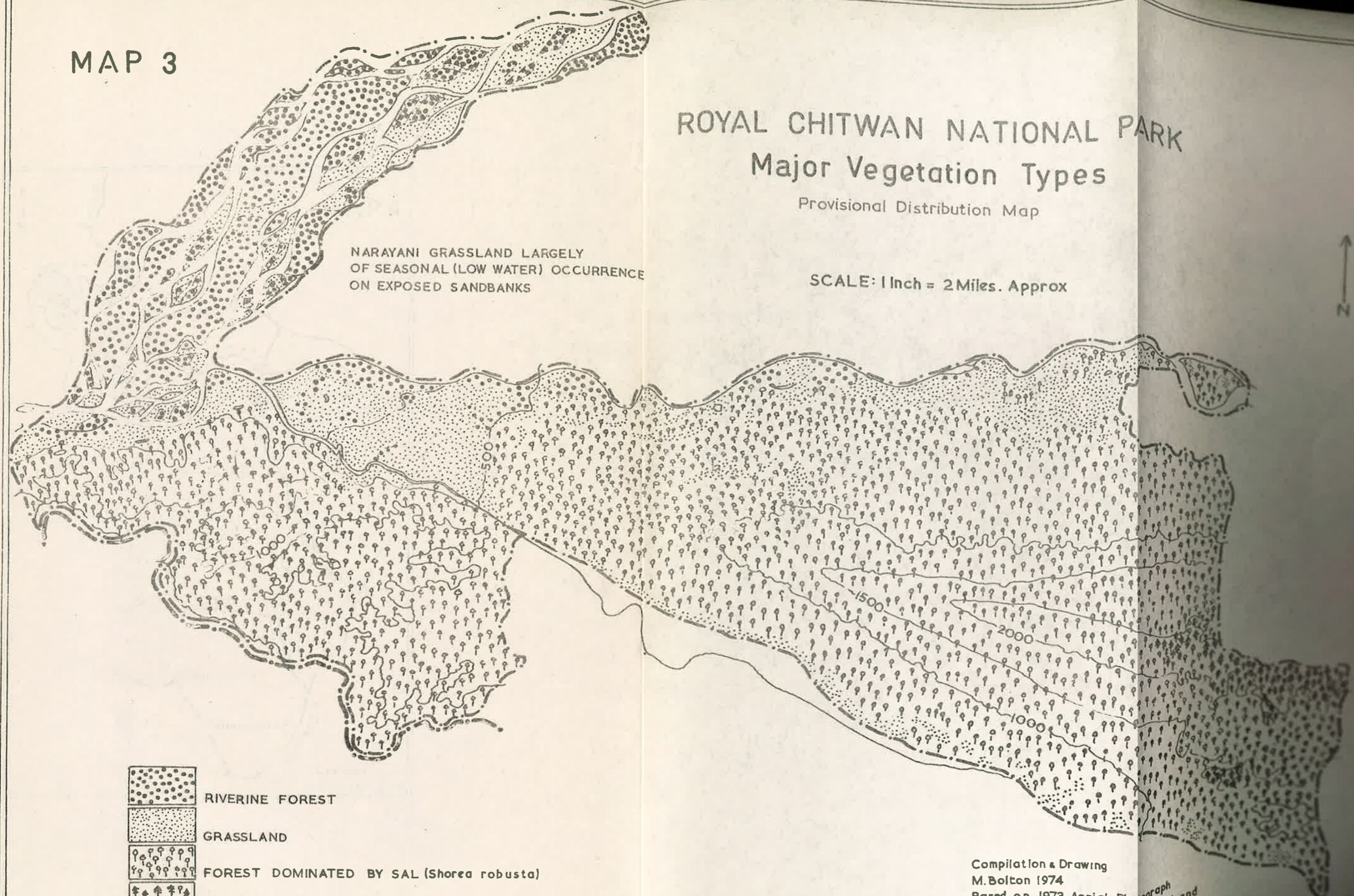
ROYAL CHITWAN NATIONAL PARK Major Vegetation Types




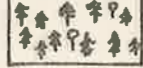
Provisional Distribution Map

SCALE: 1 Inch = 2 Miles. Approx



NARAYANI GRASSLAND LARGELY
OF SEASONAL (LOW WATER) OCCURRENCE
ON EXPOSED SANDBANKS



-  RIVERINE FOREST
-  GRASSLAND
-  FOREST DOMINATED BY SAL (*Shorea robusta*)
-  SAL FOREST WITH CHIR PINE (*Pinus roxburghii*)

Compilation & Drawing
M. Bolton 1974
Based on 1973 Aerial Photograph
Interpretation (Narayani & Rapti) and
Field Investigations by J.L. Fox

MAP 3

ROYAL CHITWAN NATIONAL PARK

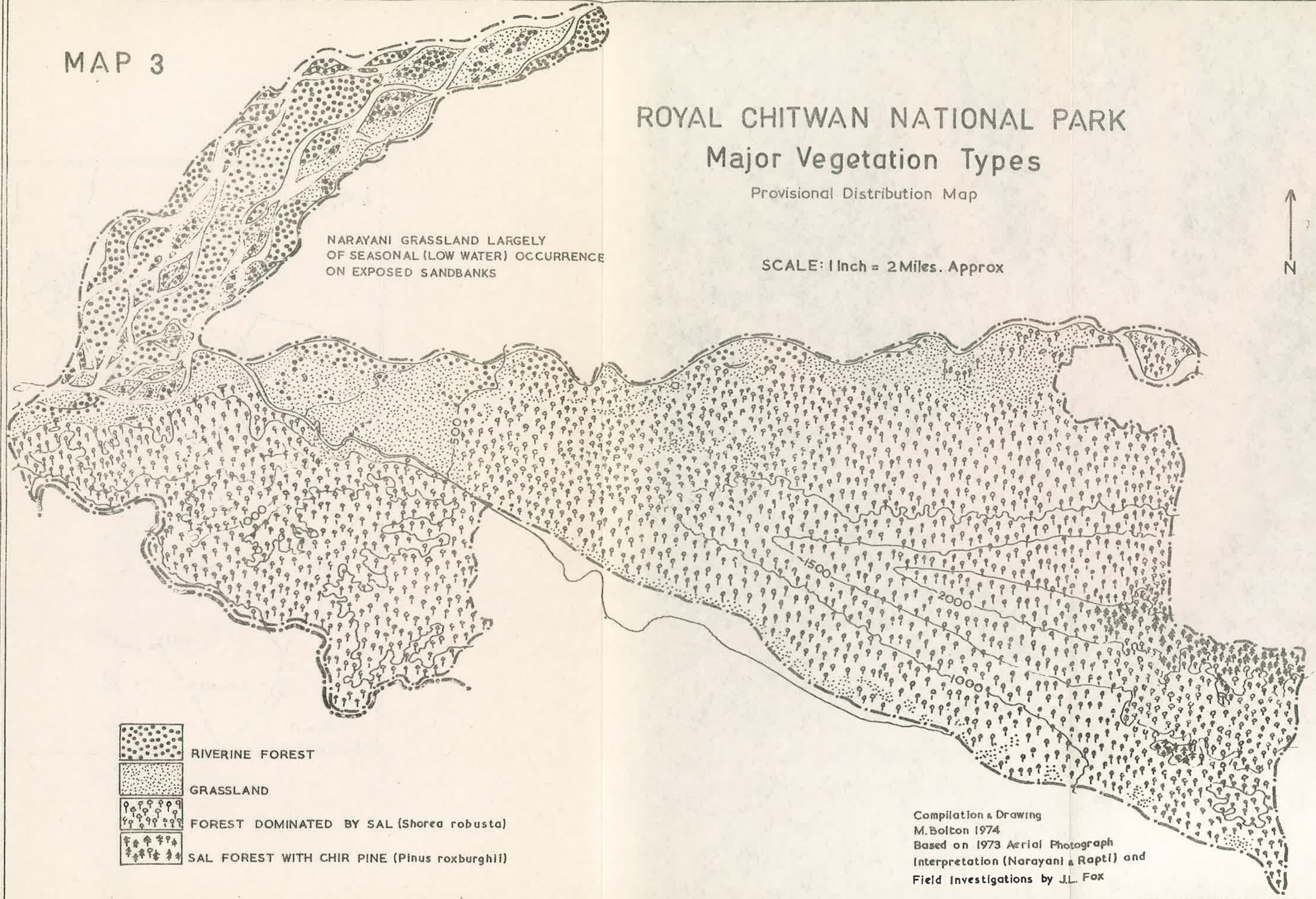
Major Vegetation Types



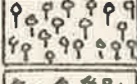

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