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THE STATUS AND DISTRIBUTION OF ELEPHANT POPULATIONS OF KARNATAKA

THE STATUS AND DISTRIBUTION OF ELEPHANT POPULATIONS OF KARNATAKA

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(With four plates and seven text-figures)

INTRODUCTION

The hill chain of Western Ghats running parallel to the west coast of India is a fascinating region from both an ecological and biogeographical point of view. The extensive hilly region retains its natural vegetation and fauna to a much greater degree than the rest of the peninsula. This last refuge of the natural fauna and flora is, however, being threatened with rapid destruction by the numerous hydro-electric and irrigation projects that are coming up, the greatly accelerated pace of forest exploitation and the increasing demand for land for plantation and cultivation. As a consequence very few virgin forests remain intact on the western ghats today and the wild life has also been nearly wiped out. It is therefore an urgent need of the day to make an accurate assessment of the status of the natural vegetation and wild life of this area. A report dealing with the natural vegetation of the Karnataka region of this area and man's impact on it has been submitted as a report to the Task Force on the Ecological Planning of Development of Western Ghats (Prasad, Nair, Sharatchandra and Gadgil 1977). The present report deals with the wild life of the Karnataka region of this area with particular emphasis on the elephant populations.

METHODOLOGY

The Western Ghats areas of Karnataka along with the eastward extension of hills across the Mysore plateau may for purposes of description be divided into the following five areas : (*a*) North Kanara, (*b*) Crest line of the Western Ghats, (*c*) Malnad, (*d*) Mysore plateau, (*e*) Kollegal hills (Figure 1)

The present report is based on studies carried out in Karnataka over a period of more than three years from May 1974 to July 1977. Over these three years we have maintained almost continuous detailed observations at Bandipur National Park. This has been supplemented by an intensive survey of the Mysore plateau from July to October 1975, a survey of North Kanara area from August 1976 to January 1977 and a survey of the Malnad, Crestline and Kollegal areas from May to July 1977.

Different methods were adopted in the different areas depending on the circumstances and aims of the study. The first intensive survey of the Mysore plateau was conducted by a party of four biologists who covered the terrain on foot. The survey area was divided into approximately ten square kilometre compartments with the aid of maps and each of the compartments surveyed by one investigator with the help of a local guide. Walking in a zig-zag route the entire terrain, especially areas favoured by elephants such as swamps, stream banks, and bamboo thickets were traversed. Whenever elephant herds were encountered details of the herd composition were noted. The distribution and degree of abundance of other wild life, based on sightings as well as on spoor marks was recorded. Particular attention was paid to elephant tracks and dung to infer the number in the herd involved. A

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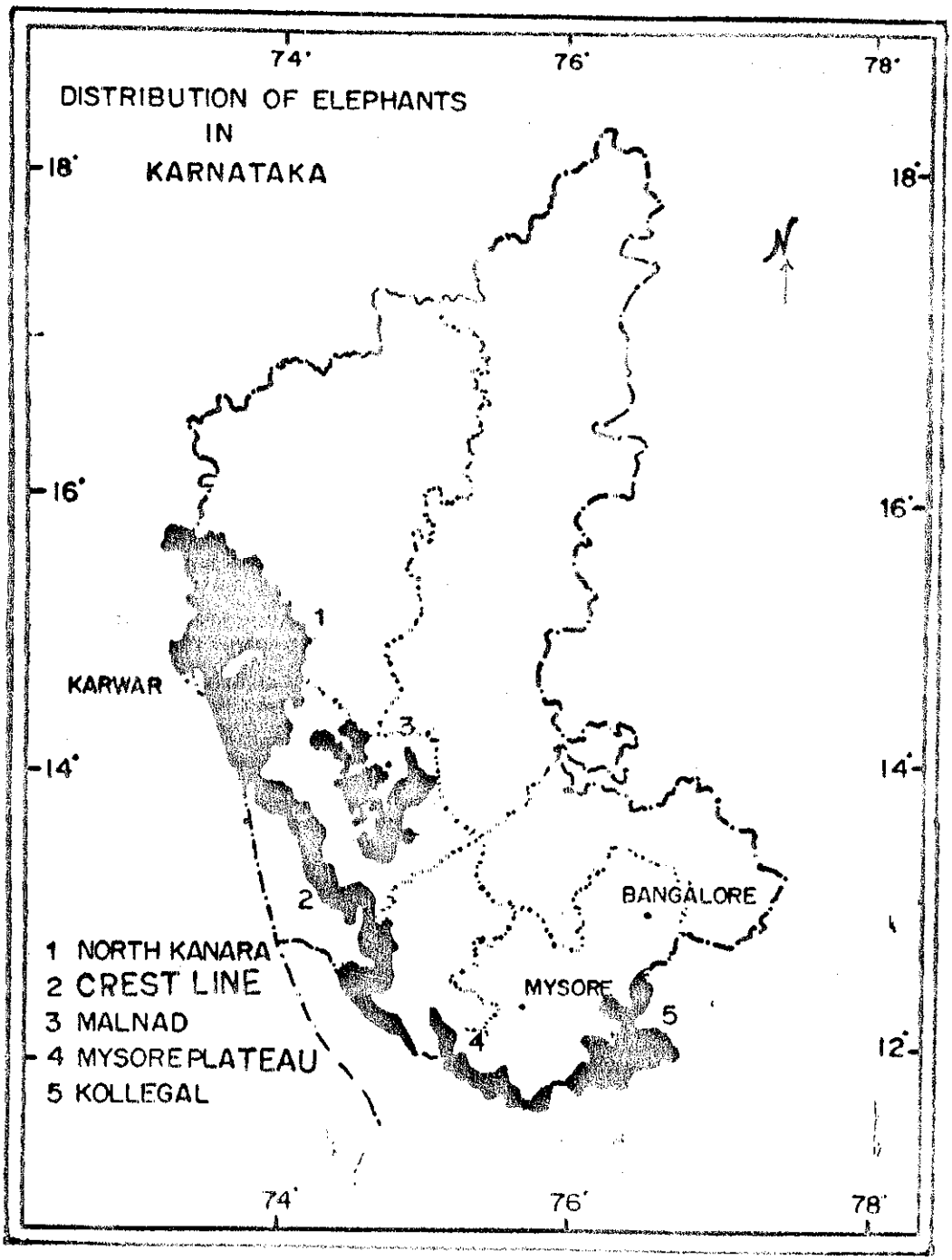

Fig. 1. Map of Karnataka forests showing the five elephant bearing areas.

detailed account of this work has been published already, (Nair, Nair, Sharatchandra and Gadgil 1977), but a resume is incorporated in this report for the sake of completeness.

The North Kanara forests are vast, and now contain wild life only in scattered pockets. The elephants in particular are very few and completely dispersed. Tracking them in the dense vegetation of this region would have been impossible in the time available. We therefore resorted to collecting the required information from the innumerable hamlets in the middle of the forest where elephants regularly raid crops. Almost all the villages inside and bordering the forests were visited and data collected on the number of elephants that raid the crops, the season of their visits and the general pattern of movement. Wherever possible this was confirmed by checking on elephant tracks. Information on the abundance of wild life species was also collected during the same visits. These details were plotted on a map and analysed with reference to the distribution of the habitat and barriers to movements and provided a good picture of the distribution of elephant herds as well as other wild animals. A similar method was adopted for the Western Ghats areas from Makut' to Bhatkal. The investigation here was faster because of the availability of a vehicle.

Basically the same method was used with more detailed field observations in the Malnad areas. The number of elephants here is much greater and the vegetation more favourable for movement and observation. The forest was covered in detail mostly in the vehicle in addition to collecting information from the villagers. The tracks and other spoor of elephants and other wild animals as well as the actual sightings were taken into account. The Kollegal areas are extensive dry hilly tracts which could not be covered in sufficient detail. This area has a number of elephants which move to and from the Sathyamangala areas of Tamil Nadu. The area was covered rapidly with a vehicle and information collected from the local people. This was checked to an extent through actual sightings as well as tracks of elephants.

North Kanara

The district of North Kanara and parts of Belgaum constitute the northernmost sector of the Western Ghats in Karnataka (latitude 13°45'N to 15°45'N, longitude 74°E to 75°15'E). The hill ranges run through this area in a north-south direction rising to an elevation of 700 to 1000 metres. To the east the hill ranges merge into the Deccan plateau at an elevation of around 600 metres. The tract receives precipitation ranging from 6500 mm at the crest of the hills to about 1000 mm on the plateau. The Western Ghats are very broad here and the extensive hilly terrain is covered with good vegetation. Until recently about 80 per cent of the district was under forest cover. The last few years, however, have witnessed a tremendous decline of the forest cover in this area because of the giant Kalinadi Hydro-electric Project and great deal of iron and manganese ore mining.

The vegetation of North Kanara ranges from tropical evergreen to dry deciduous. The only patch of tropical evergreen forest in North Kanara lies near the crestline of the ghats west of Siddapur. This evergreen forest is characterized by *Olea dioica*, *Hopea wightiana* and *Diospyros canolleana*. There is an extensive belt of semi-evergreen forest largely along the crestline and to the west of the crestline characterized by *Xylia xylocarpa*, *Terminalia tomentosa* and *T. bellerica*. Large tracts of moist deciduous forest occur to the east of the crestline and are characterized by *Tectona grandis*, *Lagerstroemia lanceolata*, *Xylia xylocarpa*, *Dalbergia latifolia* and various *Terminalia* species. The dry deciduous forest occurs in low rainfall areas bordering the Deccan plateau and is

characterized by *Anogeissus latifolia, Tectona grandis, Grewia tiliaefolia* and *Terminalia tomentosa*. There is a good bamboo growth through much of this area. With such rich vegetation, there is no shortage of fodder for elephants of this region.

This is one of the richer wild life areas in the state and can boast of elephants, gaur, sambar, spotted deer, wild pig, wild dog, panther and tiger. Gaur are now to be frequently seen in only restricted areas such as Virnoli range, western parts of Dandeli range and parts of Supa range. Tiger is widely distributed and frequently makes cattle kills particularly in parts of Mundgod range, Kirwatti range and Gund range.

Elephant population

The district of North Kanara lies at the extreme northern end of the distribution of the Asiatic Elephant on the Western Ghats in Peninsular India. Geologically also this district constitutes the northernmost limit of the precambrian igneous rock formation. Whether this coincidence of the geological regime and its consequent vegetational regime and of the elephant distribution has any further significance is not known. In recent past at least the elephants were distributed through most of the North Kanara district to the east of the crestline of the Western Ghats. That is to say their distribution largely coincided with the moist and dry deciduous vegetation. They seem to have been largely absent from the coastal tract and the hill tract to the west of the crestline which receives very heavy rainfall and harboured very dense semievergreen vegetation. The elephant population of this district earlier in this century seems to have comprised five different herds, two of which still survive as herds with males and calves. Two others seem to have been reduced to one or two bulls and the fifth one has been completely wiped out (see fig. 2).

Herd 1 : The 1957 working plan mentions the existence of a herd staying in the Barchi valley and moving through the adjoining forests of Nagargali. This herd still survives and includes about eight to ten animals. The herd spends the summer months in the moister Kurundi and Nagargali forests near Jagalbet, Nagargali areas. The last decade has witnessed the release of a number of revenue forest lands for cultivation within the range of this herd. Apparently the cultivators did not suffer much from crop raiding by this herd in the initial years of cultivation. Huge areas within this range have recently been cleared in connection with Supa dam of the Kalinadi hydro-electric project as well as for manganese mining. This has led to the elephants being forced into contact with the cultivated areas with much raiding of crops in villages like Barchi, Shingergaon, Kudilgaon, Aveda, Kheda, Bommardo, Ajgaon, Usoda, Badgund, Gobral, Vaini, Adangaon etc. in the years 1975 to 1977 (see fig. 3).

Herd 2 : Korlhally (1957) refers to a bigger herd staying in the Kaneri river valley. This herd used to spend the drier months in the Kaneri and Nagjhari river valleys and used to range in the Dandeli, Bhagavathi, Ambga Jumba (present Ambikanagar), Phansoli, Gund, Ulvi, Ganeshgudi areas as also towards Hunasgere, Kolikere, Kirwatti side. In the distant past they used to go as far as Kalghatgi. The last three decades since independence have witnessed a great deal of cultivation particularly towards the Yellapur side being taken up. This herd apparently used to raid the crops in its range and was shot. There is hardly a village within the range of this herd where one or two elephants have not been shot since 1947. When the paper mill was established in Dandeli area elephants used to come right upto the township of the mill and were shot there. By about 1965 this herd was reduced to three to five animals. One more elephant was reported

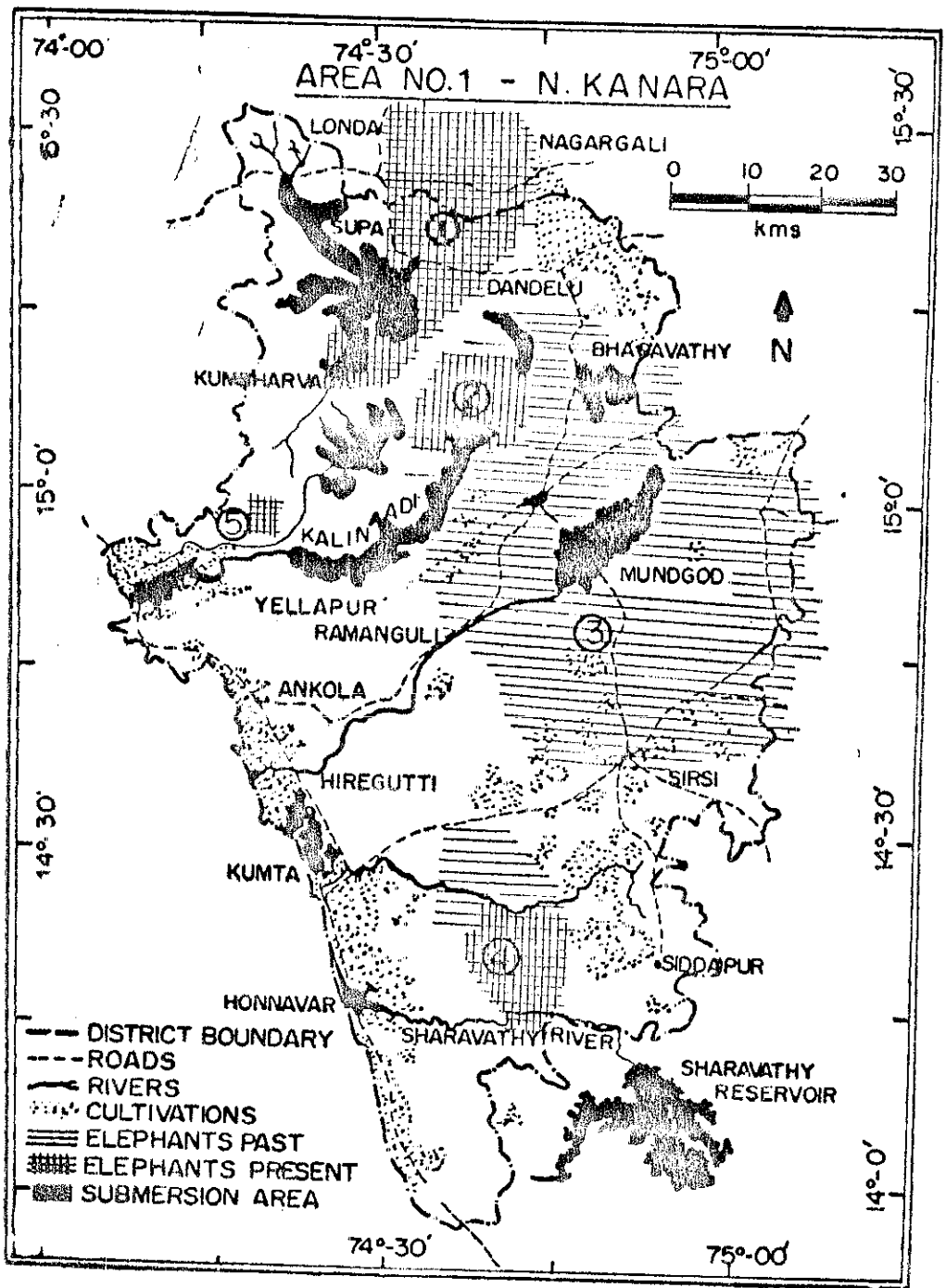

Fig. 2. Distribution of elephants in North Kanara.

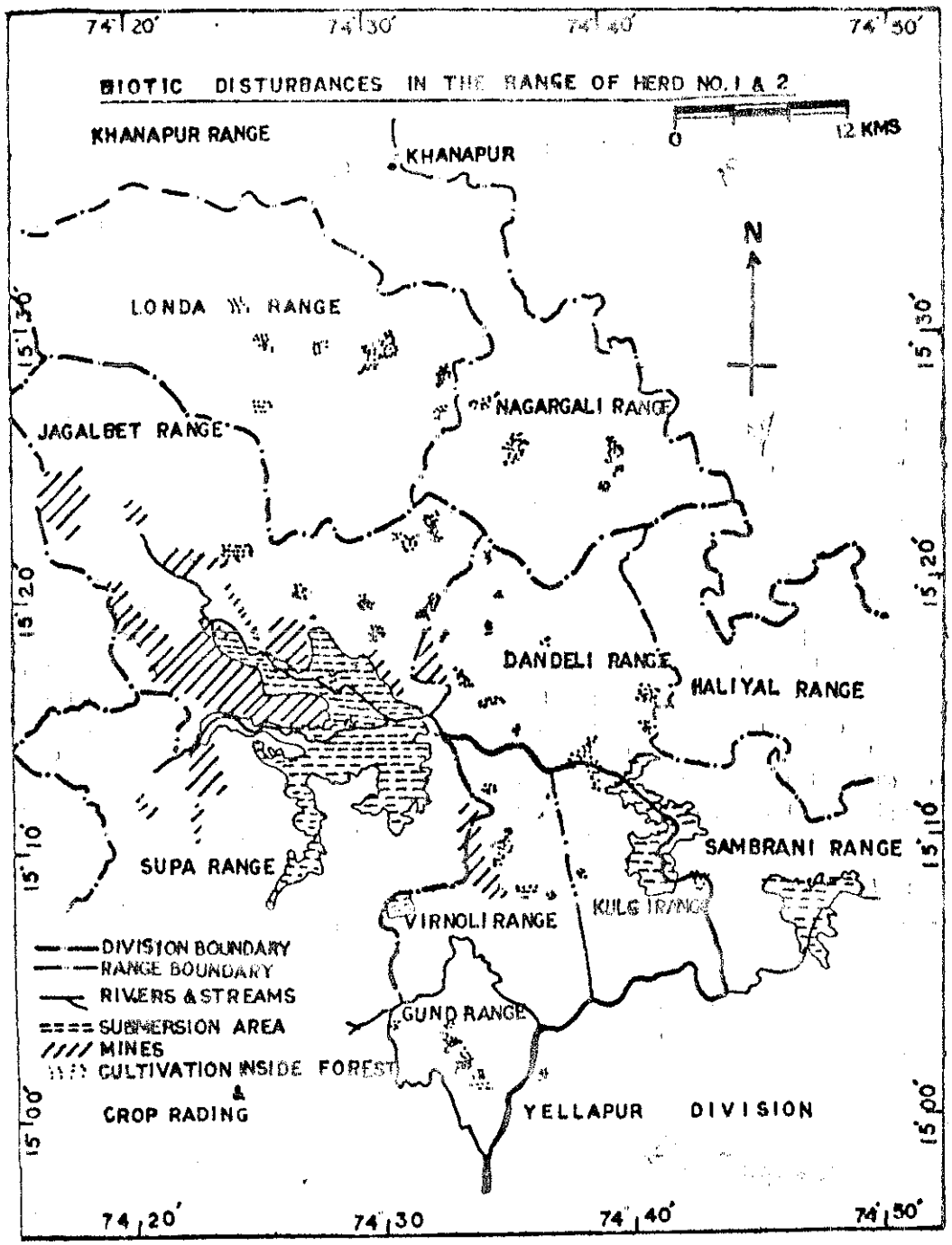

Fig. 3. Maps of Haliyal, Yellapur and Karwar divisions indicating the various disturbances affecting the forest habitat and the elephant populations.

to have been found dead near Nagjhari valley around 2 years ago. This year we have seen the tracks of only a solitary elephant.

It is interesting to note that when the first herd was driven out of the Supa forest people believed them to have come from the Nagjhari area where the construction of the power-house had begun just at that time. However, a big belt of villages and cultivations separates the range of the herd number two from that of herd number one. Since no elephants have been noted to have passed through this belt it is unlikely that any animals from herd two of the Nagjhari valley could have crossed over into that area.

Herd 3 : A herd of eight to ten elephants has been reported from the Mundgod, Katur, Bilki, Manchikere, Bharathanahally, Chevathy, Sirsi and Hulekal areas in the pre-independence days. The forest in this entire belt is riddled by a network of cultivation throughout the region. Such cultivation is highly susceptible to crop raiding by elephants and the elephants were consequently completely shot out. There are records of elephants having been shot at Katur, Mundgod, Bharathanahally, Pata, Attangi, Chipgeri, Indoor, Chevathy, Sirsi etc. The complete herd was eliminated about 30 years ago.

Herd 4 : There is presently a herd of a few elephants and a solitary bull in the Gersoppa region. They range over Badal, Jankadkal, Medni, Herebail, Mahime, Gersoppa areas. This herd has also received some recruits from the Linganamakki submersion area of the Sharavathy hydroelectric project. The herd is extensively utilizing the scrub forests created by human interference which cover the hilly terrain towards the coast. The climax forest in this region is semievergreen which persists towards the more interior parts of the range. Two elephants were found shot dead on the bank of Sharavathy river in May 1979.

Herd 5 : There is now a solitary elephant in the Ghotegali region in Kadra range in the Sanake, Hajkarni, Bargadde areas. This elephant probably moves into the Goa forests also. There was apparently another elephant along with the surviving one ; the second elephant is reported to have been shot a few years ago. The survivor does raid crops and is certainly in danger of being eliminated. The relation of these elephants to the others is not clear.

Discussion

The district of North Kanara with its hilly terrain, and malarious climate remained largely under forest cover and very thinly populated until the recent times. The huge forest was extremely rich in wild life, being particularly known for the gaur and tiger. This northernmost part of the Elephant range was included in the British Province of Bombay presidency while the adjacent range of elephants to the South was included in the Old Mysore State. Kumri cultivation was banned in forests of the Mysore State in 1847 and that resulted in a large influx of people to the North Kanara areas (Garland 1935). Perhaps as a result, these forests are characterised by the existence of extensive enclaves of cultivation even inside the reserved forests (Plate 1).

This cultivation inside the forests has been continually on the increase and has accelerated since Independence. The pace of settlement of people into this area has particularly increased since the eradication of malaria in the nineteen-fifties. The recent years have also witnessed many other disturbances in the forest, particularly with the starting of a paper industry at Dandeli and the execution of the giant Kalinadi Hydroelectric Project and mining for manganese (Plate I). As fig. 3 shows a great deal of the forest in the Haliyal division has been lost either to submersion or to mining, and the rest is more and more subject to enclaves of cultivation.

The demands of the people on the forests for firewood and grazing are also escalating. Vast areas in Sirsi and Honnavar divisions are classified as minor forests which are open for collection of leaves for manure firewood etc. Most of these areas are completely degraded and reduced to scrub from the original semi-evergreen condition. Several thousand families of a pastoral caste called Gavli Dhanagars have migrated from the north and have settled with their buffaloes and cattle throughout the Haliyal, Yellapur, Mundgod, and other taluks of North Kanara. Overgrazing by the animals belonging to these people is seriously affecting forest regeneration.

This tremendous loss of vast chunks of forest habitat along with the degradation of the rest has seriously depleted the wild life of this area. Elephants are particularly susceptible because they wander over a vast terrain and are attracted to the cultivated enclaves inside the forest. When they indulge in extensive crop raiding they are shot at and slowly eliminated. A very large number of elephants has been killed in this fashion throughout North Kanara. There even used to be a reward for the killing of crop raiding elephants. All these pressures have well nigh eliminated the elephant from this vast tract of forest. The Dandeli Wild Life Sanctuary which could have played a role in the preservation of wild life in this area has been very heavily disturbed by the Kalinadi Hydroelectric project and there are moves to remove it from the protected areas list.

A bold and imaginative approach is called for if we are to save the relics of the magnificent wild life of this area. Perhaps a new sanctuary could be constituted around the Supa dam by incorporating areas from Nagargali, Jagalbet, Supa and Dandeli ranges. All pockets of cultivation from this sanctuary should be shifted by taking advantage of the resettlement programmes for the submersion areas. Such a sanctuary around the Supa lake could develop into a great tourist attraction, and could save at least some of the rich wild life of this area.

Crestline

To the south of the North Kanara forests the crestline of the Western Ghats rises to much greater altitudes exceeding 2000 metres in places (latitude 11°30'N to 14°N, longitude 74°15' to 76°30'E). The hill ranges here are further inland and narrower than in North Kanara. The rainfall is very high, exceeding 6000 to 7000 mm in places. It is also the place of origin of a number of important rivers like Nethravathy, Tunga and Bhadra. To the west of the crestline, there are belts of evergreen forest on the rather steep slopes. The important genera of evergreen forest include *Dipterocarpus*, *Hopea* and *Poeciloneuron* in the northern parts and *Viteria*, *Calophyllum* and *Canarium* in the southern parts. The semi-evergreen and moist deciduous forests are located mostly on the eastern slopes, while the foot hills on the western face are characterised by *Terminalia*, *Tectona* and *Lagerstroemia*.

Although the area harbours all the major wild life species including elephant, gaur, sambar, wild boar, spotted deer, wild dog, panther and tiger, the only species to be seen in sizeable numbers is the wild boar.

Elephant population

Only a few isolated groups of elephants are found in these evergreen forests. This is obviously a suboptimal habitat for elephants and there are only four small herds of elephants in this areas (see fig. 4).

Herd 1 : One or two elephants are reported from the Meginevalley, Kollurghat, Nagavalli areas (Kesava Vittal 1945). Elephants raid crops occasionally in villages in Meginevalley and Nagavalli. This area adjoins the range of Herd No. 5 of North Kanara, but a hill range

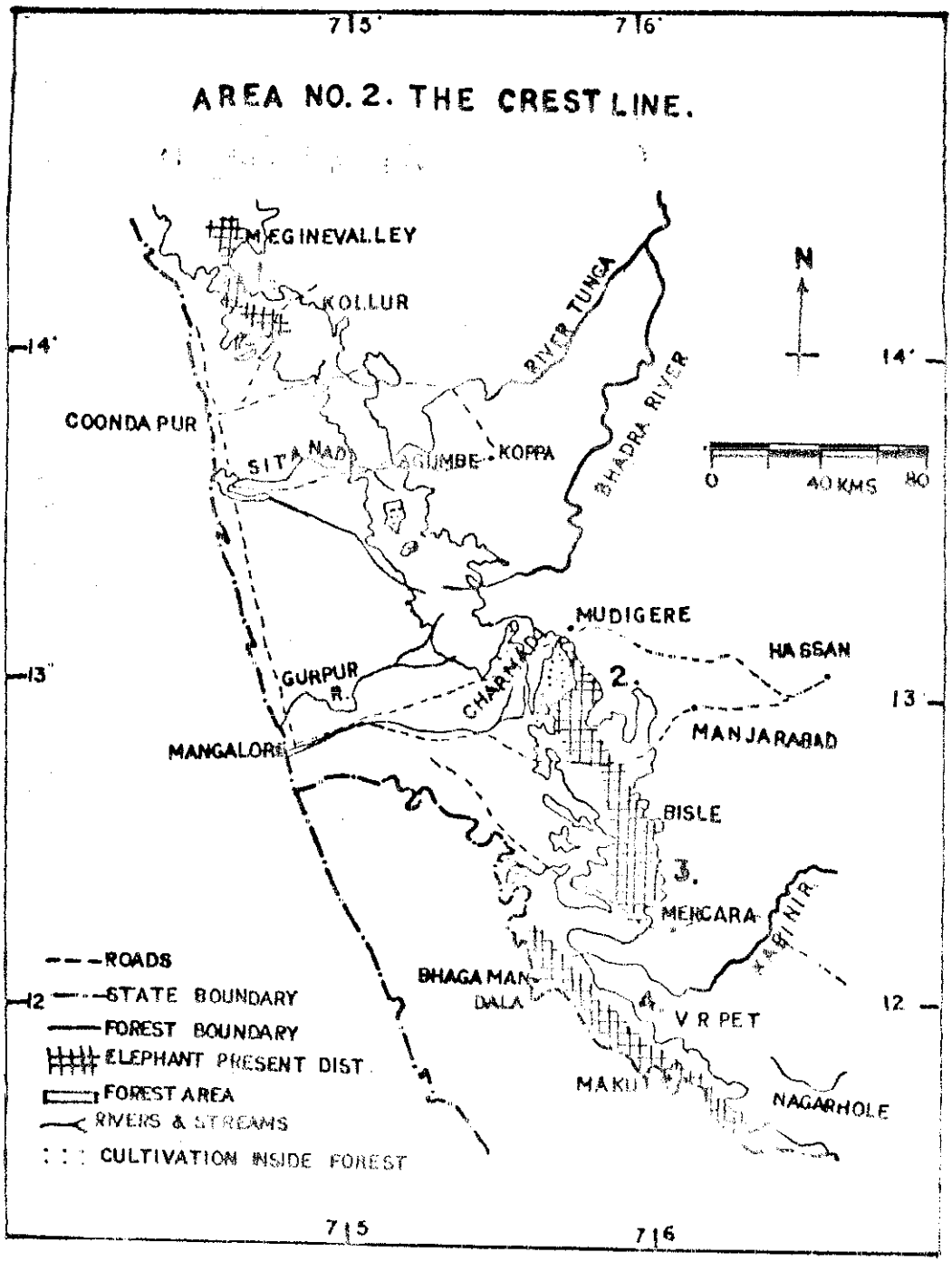

Fig. 4. Distribution of elephants along the crestline of Western Ghats.

forms a geographical barrier between them. Recent sighting indicate the presence of a single elephant only in this area.

Herd 2 : South of the area described above, a small herd of 5-6 elephants is reported in the ghat forests of Mudigere, Belthangadi and Uppinangadi ranges. These elephants cause serious damage to crops in villages like Sathyaganahally, Guthyhally, Byrapura, and Kumbharde. Repeated complaints from these villagers, situated mostly deep inside forest has forced the authorities to seek permission to shoot these elephants.

Herd 3 : Further south there is another group of elephants ranging in the ghat forests of Bisle, Shiradi, Pushpagiri, Subramanya and Sampaje. The number of elephants reported is about 15 and they raid paddy and arecanut gardens. The elephants seem to be in 2 groups, the smaller one of 5-7 elephants moving in the forests near Shiradi and the others in remaining areas

Herd 4 : This is the southernmost herd in the western ghats proper of Karnataka They range over extensive evergreen forest areas of Brahmagiri, Makut, Bhagamandala and some parts of Sulya forest ranges. About 20 in number, they raid crops of paddy, pineapple, jack, plantain, arecanut and tapioca.

Discussion

Even though elephants are not frequently found in evergreen forest in large numbers, their great adaptability to different climates and a very wide spectrum of food species enables them to survive in these forests. Probably they have migrated to these areas from the deciduous forests on either side of the ridge when the latter areas were brought under plough. Thus the evergreen forests which earlier were only their summer resorts for water and fodder which will be scarce in the drier forests have become their permanent habitat (Plate II).

Extensive crop raiding is indulged in by the elephants of this area and it invariably results in the killing of the pachyderms. Establishment of villages in the cultivable areas, deep inside the forest and the continued release of land in the middle of the forest has led to more and more crop raiding and the consequent killing of the elephants (Plate III).

Malnad

The Malnad area lies to the east of the Western Ghats described above, separated from the latter by a wide belt of coffee plantations and cultivations The area is relatively plain with an elevation of 800 to 1400 metres from sea level. The area extends from Aynur in the north to Mudigere in the south between latitudes 13°N and 14°15'N and longitudes 75°E to 76°E with an annual rainfall of 1500 mm to 800 mm. There are 3 main hill ranges, namely the Shankar hills, Karadibetta and the Bababudangiris. The rivers Tunga and Bhadra flow along this area. This region includes the Shettihally Wild Life Sanctuary and the Bhadra Wild Life Sanctuary.

The vegetation of this tract is of tropical moist deciduous and dry deciduous nature with *Tectona grandis*, *Lagerstroemia lanceolata*, *Anogeissus latifolia*, *Xylia xylocarpa* and *Terminalia tomentosa* being the characteristic species. The forest is fairly thick with an extensive undergrowth of weeds and bamboo.

This region has one of the best wildlife concentrations in the state, harbouring populations of elephants, gaur, sambar, spotted deer, wild pig etc The Bhadra Wild Life Sanctuary is one of the few places in the state where one could easily sight gaur. The anthropogenic pressures over the area are much less and hence the rich wild life of this area has remained largely unmolested.

Elephant population

The presence of perennial rivers, reservoirs, and plenty of bamboo, grass and other fodder species in a moderate rainfall area makes this region an ideal habitat for elephants. There are five groups of elephants in this area (see fig. 5).

Herd 1 : This comprises 2 or 3 elephants, which often raid crops in different villages in the Anandapuram, Rippenpet and Aynur forest ranges. The recent killings of 2-3 people by these elephants has given them much notoriety. Human disturbance causes them to move over extensive areas, coming more and more in contact with villages and cultivation

Herd 2 : Forests in the range of Sacrebyle had a large population of elephants before the construction of the Tunga reservoir, but harbour only about 5 elephants now. The clearing of vast areas of forest both from submersion and for rehabilitation has brought the elephants in conflict with human settlements everywhere. Because of persistent complaints of crop raiding the authorities are contemplating capturing the elephants. The elephants sometimes cross the river and destroy crops in some parts of Umblebyle range also.

Herd 3 : This is a large population of elephants, further divided into two groups most of the year by the backwaters of the Bhadra reservoir and steep hills with plantations of coffee. Construction of the Tunga reservoir has already isolated herd No. 2 from this herd. The first group, about fifteen in number stays in the forests of Lakkavally range, sometimes crossing into the forests and villages of N.R. Pura forest range doing occasional damage to crops. Some attempt was made to capture a few of these elephants but it is reported that none of the captured elephants survived in captivity.

The second group is the largest of all the herds considered so far and consists of a breeding population of about 30 to 40 elephants moving mostly in the forests of Bhadra Wild Life Sanctuary. Excepting occasional damage done to the villages deep inside the forest and one or two peripheral villages the problem of crop raiding is not severe in case of this herd.

Herd 4 : In addition to these, elephants are occasionally seen in parts of Balehonnur and deciduous forests of Mudigere and Kalsa forest ranges numbering not more than 10 in all. One of these elephants was accidentally electrocuted last year while raiding crops

Herd 5 : The few elephants seen in the dry deciduous forests of Hassan range also may be included along with the Malnad areas

Discussion

The dry and moist deciduous vegetation, with a number of fodder species and perennial water sources make this area an ideal habitat for elephants. Even though the area is now very much fragmented, most of the habitats are still large enough to support small populations. It is quite possible to protect elephants of herd No. 3 with some effort because the villages inside its range are few and other anthropogenic disturbances are at a minimum.

MYSORE PLATEAU

This area, between latitude 11°35'N and 12°45'N, and longitude 75°45'E and 77°E lies on the eastern side of the Western Ghats, adjoining the forests of Kerala and Tamil Nadu. The region is mostly plains, with rainfall ranging from 1000 mm to 600 mm. The vegetation is dry and moist deciduous consisting mainly of teak, *Anogeissus latifolia*, *Terminalia* and *Lagerstroemia* species and bamboos. Rivers Kabini and Cauvery flow along this area. This region includes the Bandipur National Park and Nagarhole Wild Life Sanctuary.

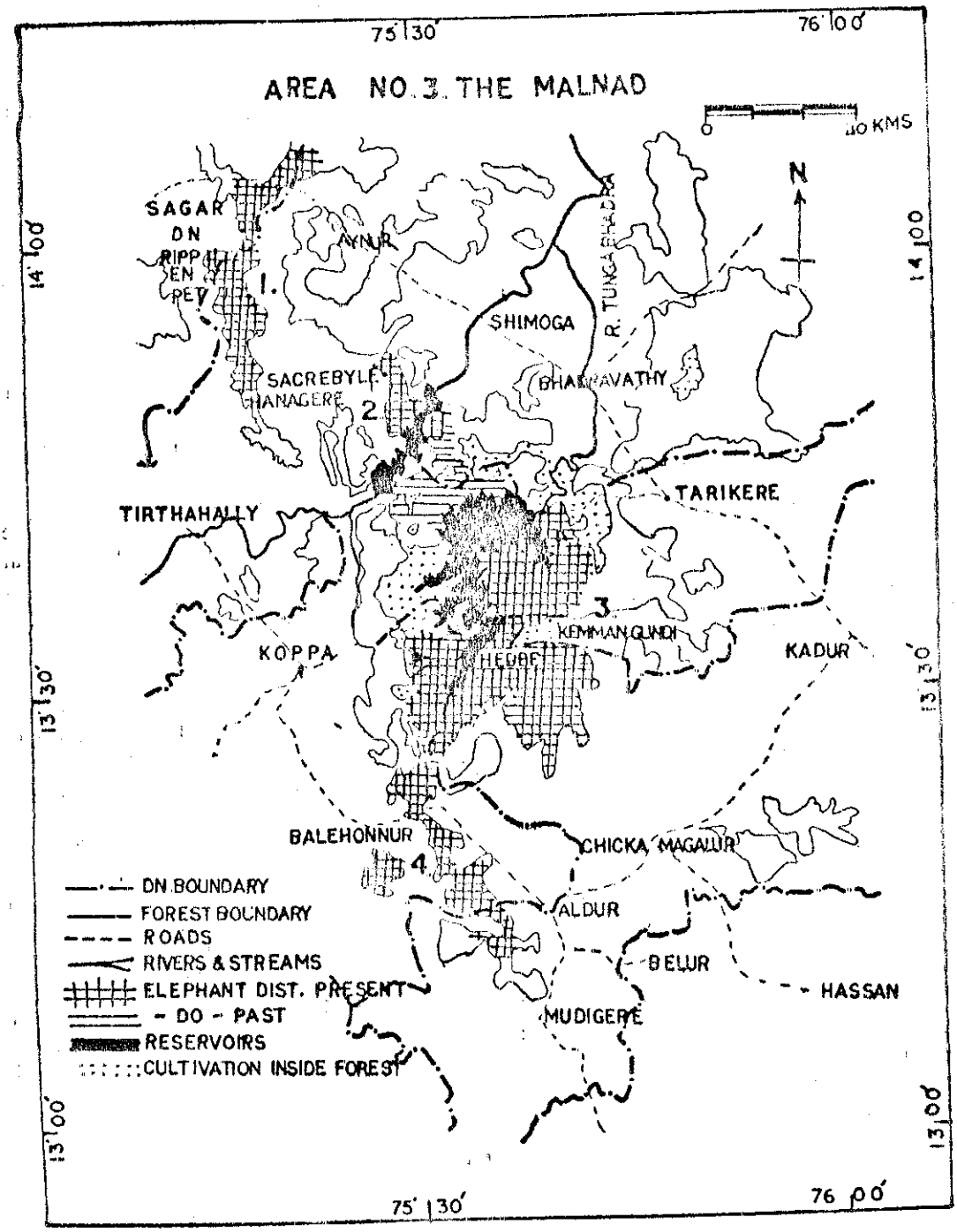

Fig. 5. Distribution of elephants in Malnad area.

The area has perhaps the best wild life concentration in South India, harbouring large herds of elephant, spotted deer, wild pig, wild dog, hanuman langur, and in some parts gaur, sambar, and occasionally tiger and other cats.

Elephant population

About five elephants that are reported around forests of Somavarpet—in Maldare and Dubare state forests are more or less isolated from the rest of the population which has a continuous range in an extensive forest. The elephant population of this region cannot be described in herds for their ranges overlap and it is difficult to identify the individual herds (see figure 6).

There was a large concentration of elephants along the Kalkare, Begur, Bandipur and Mudumalai area during the rainy season when a survey was conducted in 1975. Migration of elephants from the wetter areas of Coorg, Wynaad and Benne during the monsoon to these drier tracts is responsible for this. The total number of elephants in the Bandipur-Mudumalai area was estimated around one thousand and that in the remaining Nagarhole areas around three hundred. There does not seem to be any notable disparity in the sex ratio (Plate IV).

Discussion

Here, too, the elephant habitat has been continuously shrinking. The destruction of Pulpally forests of Kerala is probably the reason for the high density of elephants in Gundre and Begur areas. If this trend is continued it would result in further overcrowding of the elephants. There are problems arising from crop raiding in most of the peripheral villages. There is occasional poaching of larger mammals in this area especially in the north-western parts. The construction of the Kabini reservoir has created a geographical barrier for movement of elephants. Fodder and water is not uniformly available, but if the elephants are able to migrate to wetter areas in summer, it would not become a limiting factor. For fuller details see Nair *et al.* (1977).

Kollegal Hills

This area, lying between 11°30′ and 13°N latitude and 77°15′ and 77°45′E longitude, extending from the Nilgiris to Bangalore is a Western spur of the Eastern Ghats. This discontinuous chain of hills harbours mostly dry deciduous and scrub forest. The rainfall is around 500 mm except on the high BRT hills where it is nearly 1000 mm. The dominant tree genera are *Anogeissus*, *Ficus*, *Acacia*, *Grewia* and *Santalum*.

Almost all the major wild life species like sambar, spotted deer, gaur and wild boar occur in this area only in small numbers and hence the elephant becomes the prominent species.

Elephant population

This extensive forest is continuous with the Sathyamangalam areas of Tamil Nadu and has innumerable villages all over the area. Elephant herds are frequently sighted, but an estimation of numbers is difficult because of their seasonal migration and because of the extensive range. A survey similar to that of the Mysore plateau is necessary to arrive at an approximate estimation. In any case the number of elephants at any time does not seem to exceed 200 in this area. There is frequent crop raiding in many villages and a few elephants get shot annually during this process (see figure 7).

Discussion

This area can sustain a large population of elephants because of the presence of the perennial Cauvery river, many fodder species of trees and

Above : Paddy cultivation in the middle of forest in North Kanara Such fields are subject to severe crop raiding by elephants.

Below : Manganese mining in North Kanara ; a major source of disturbance in elephant forest

12.A.

Above: The grassy downs of Western Ghats in Karnataka are not a habitat favoured by elephants.

Below: Dense evergreen vegetation on Charmadi hills. This is a suboptimal habitat for elephant

Above: An arecanut garden in the middle of forest in South Kanara. The trees lying on ground have been damaged by elephants

Below: The Kerala-Karnataka border near Makut in Coorg. Hill slopes originally covered by dense evergreen forest have now been put under cultivation on Kerala side

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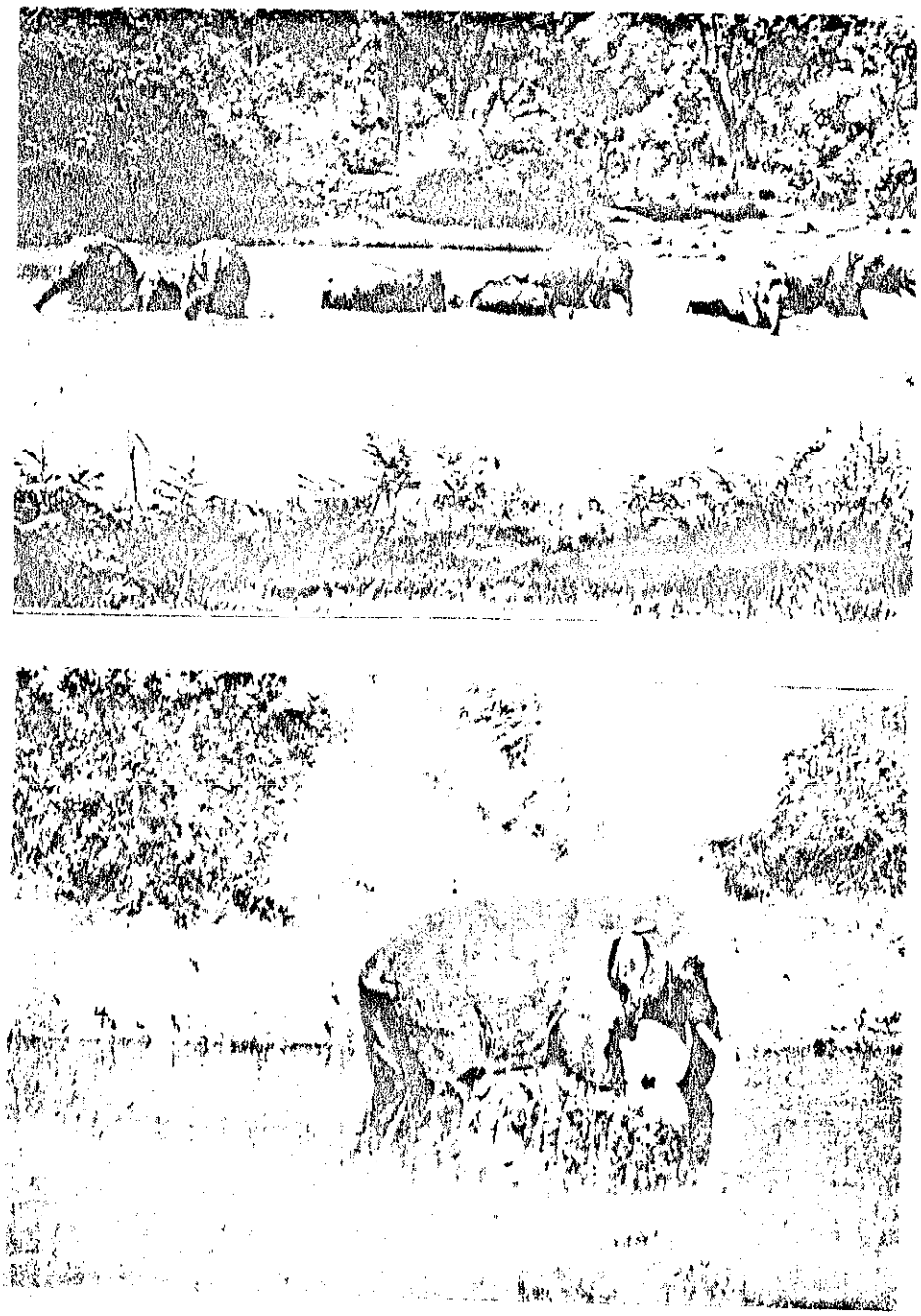

Above: A herd of elephants at a pond at Bandipur. This dry deciduous forest is near optimal elephant habitat during the monsoon.

Below: A stump tailed male elephant at a pond at Bandipur. Such easily identifiable animals could be followed to yield valuable data on elephant movements.

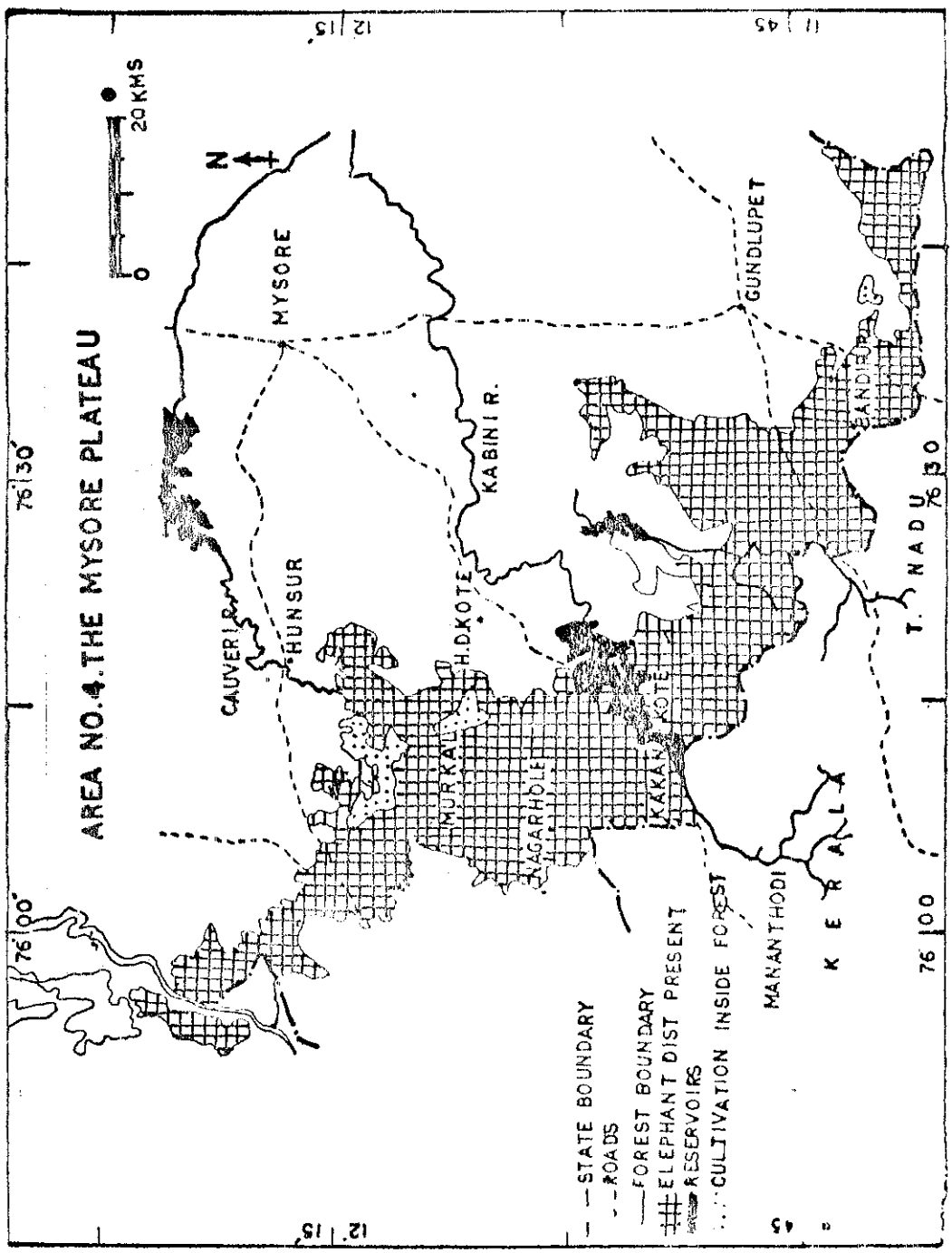

Fig. 6. Distribution of elephants on the Mysore plateau.

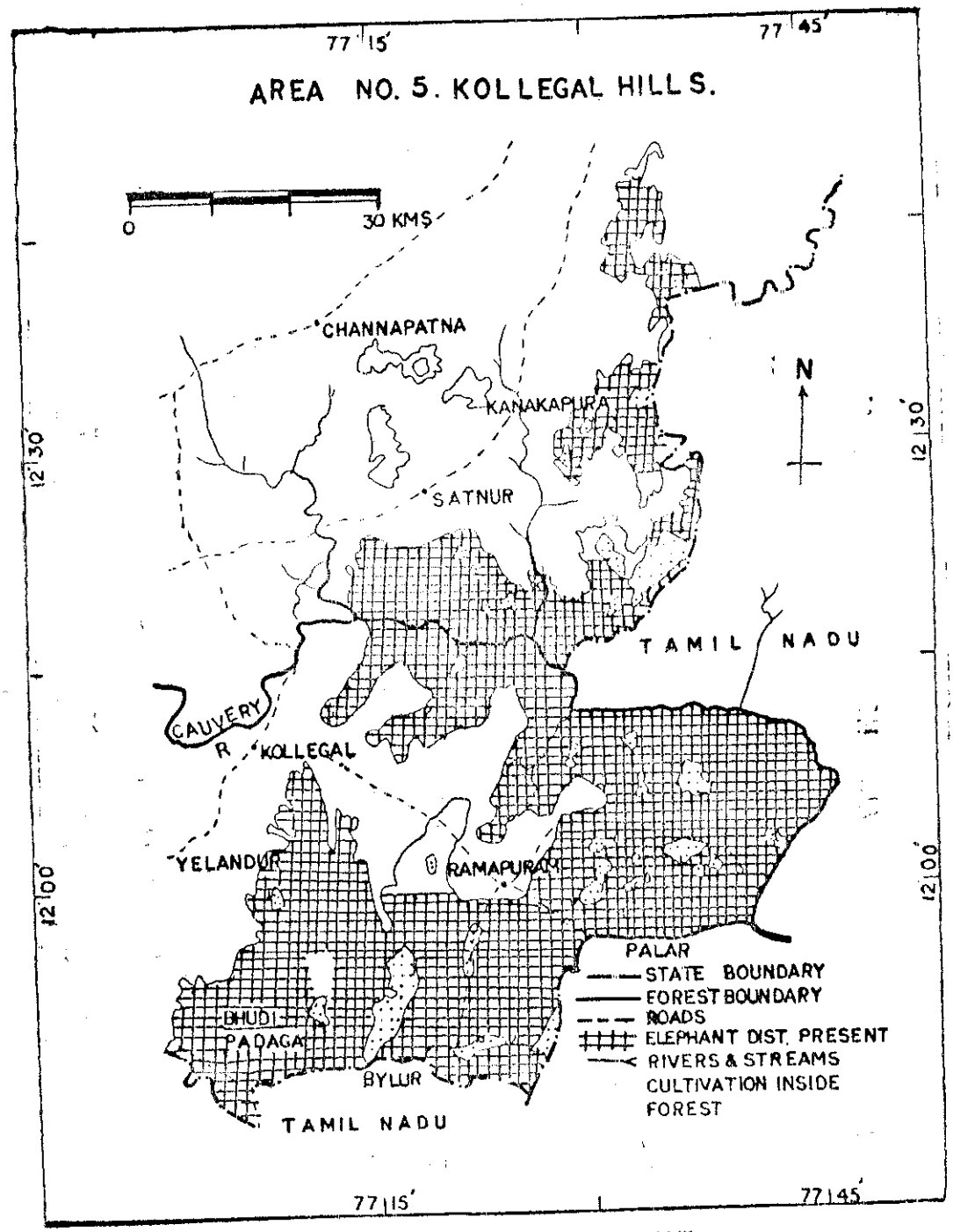

Fig. 7. Distribution of elephants on the Kollegal hills.

shrubs and the moist B.R. hills for migration in summer.

MANAGEMENT

It is clear that even though Karnataka has a good population of elephants their habitat is mostly discontinuous and there is an urgent need for protection of elephants and their habitat to conserve the species. Four major factors will play a crucial role in the conservation of elephants in the coming days They are (1) overcrowding of elephant ranges, (2) construction of hydroelectric or irrigation projects, (3) crop raiding by elephants, (4) poaching.

Overcrowding :

With the rapid shrinkage of habitat, the elephants are being forced into smaller and smaller areas. Such areas consequently reach very high densities of elephant populations. The Bandipur National Park areas, for example, now harbour almost 2 elephants per square kilometre. Investigations on the African elephant suggest that elephants are at an equilibrium with their environment at much lower densities of about 1 elephant per 5 square kilometres (Fowler & Smith 1973). It is therefore likely that the densities such as currently noticed at Bandipur National Park may have serious adverse consequences in the long range. The situation obviously needs to be watched carefully.

Big projects :

The big projects consume vast areas of forest. For rehabilitating the displaced people from submersion areas further forest areas are cleared. The Tunga and Bhadra Reservoirs have divided a good population of elephants into three or four fragments. The construction of the Kali hydroelectric project will have its effects on the surviving elephants of herd No. 1 of North Kanara. The Kabini reservoir has rendered migration of elephants from Nagerhole areas to Bandipur extremely difficult. A hopeful sign, however, has been the timely intervention in construction of a reservoir near Mudumalai which has saved some of the best elephant country in South India from going under water.

Crop raiding :

Crop raiding and subsequent shooting forms the major threat to the elephants on the Western Ghats. This is the result of indiscriminate allotment of wetter areas deep inside forest and cultivation of the revenue forests or grazing lands which used to form a buffer between wild animals and cultivation. Almost all the herds of elephants in Karnataka raid crops today and to protect both the crops and elephants is difficult. Rehabilitation of some of the villages out of places with a good concentration of elephants seems imperative if the elephant is to be protected.

Poaching :

Poaching of elephants, though rare in the areas under study, does occur in some parts especially on the eastern side of Kollegal hills. This if extensive could disturb the sex ratio and have a very adverse effect on the populations.

The future :

Taking all factors into account, the fate of the isolated small herds of North Kanara, Crestline and Malnad areas seems sealed. There seems to be little hope of saving them, and they appear destined to be shot out one by one and disappear, as many other herds have over the past half century in these areas. There is much more hope of conserving the population of the Bhadra sanctuary area, of Nagarhole and Bandipur sanctuaries and possibly of the Kollegal hills. Even here the future depends of preventing further shrinkage of areas and encroachment by cultivation in the heart of elephant forest. Even though everything is

done for the maintenance of the integrity of the habitat, a certain amount of crop raiding will inevitably continue. An effective scheme for granting compensation for loss of crops will therefore have to play an important role in the future conservation of elephants of Karnataka.

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