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Abstract: The study area is 120 km NE of Windhoek with Okahandja in the west and Steinhausen in the east. In 1984, 21 cheetahs were caught and 13 of them marked with radio-collars. 5 cheetahs were killed on farms, 4 because they had killed livestock and one as a hunting trophy. By regularly visiting the farmers, a good co-operation could be established. 44 cattle claves, 33 Boer goats and 11 sheep were killed by cheetahs. These kills occurred on 10 farms. Preliminary results on ranging behaviour, home range size and on reproduction and group size are presented.

Department of Agriculture
and
Nature Conservation

Directorate : Nature Conservation
and recreation division

The Ecology, behaviour and Movements of Cheetah on farm areas of S.W.A/Namibia.

Annual Report : November 1984

Research Official : D. Morsbach.

Introduction

This project, which was started by M.K. Roberts in September 1982, was handed over to me in December 1983, and so this report covers the period 1.12.84 to 31.9.84.

The first 2 and a half months was mainly spent getting up to date with the available literature, the project proposal and the accepted project plan as well as the year of field work done by Mr. Roberts.
A few short visits were made to the study area.

By mid-February I was in the study area on a permanent basis and was in camp set-up by Mr. D. Metzger on the farm Otjisauna North.
Because of the shortage of technical-staff, field assistants could only be used for very short periods in the study area.
Much of the planned field work had to be postponed, and therefore much of the work was concentrated on capturing the cheetahs, marking them with radio-collars and then following

them intensively.
In the first 8 months of the project, a clear picture of the homeranges was achieved.
In the past 8 months, a total of 21 cheetahs were captured in the study area. 13 were marked with radio-collars. One of the cheetahs died in a trap-cage.
2 of the marked cheetahs had begun to catch outstanding numbers of cattle calves and were killed in September.
2 cheetahs were marked with radio-collars and were translocated to Hardapdam game reserve.
6 cheetahs that were captured in the study area were killed.
The relavent farmer had experienced many losses caused by cheetahs in the past and was not prepaired to mark the animals and then set them free again.

5 cheetahs in the past 8 months were shot by farmers in the immediate study area, four of them having caused large scale domestic animal deaths, and the fifth cheetah was hunted as a trophy.

In the past months, much time was spent in regular visits to the farmers, which resulted in outstanding co-operation and help from virtually all the farmers. Continuous and regular reports of domestic animal deaths caused by cheetahs were received from these farmers.

Study Area

The study area was already chosen by Mr. Roberts; motivated by a report of recent questionares to all S.W.A farmers, which showed this area to be the biggest cheetah problem area.
This area which falls within 2 districts and which comprises 20 farms, has a total surface area of approx. one ~~thousand~~ hundred thousand hectares. The area is approx. 120km North East of Windhoek, alongside the first part of the Swart Nosob River, with Okahandja in the west and Steinhausen in the east. Virtually all the farms are intensively cattle farmed with game farming and hunting as an additional income.

Methods & Techniques

The extremely shy behaviour of the cheetah, especially in the farm areas, where these predators are often chased and caught, necessitated the use of radio-telemetry equipment for the continuous and accurate monitoring of the animals movements and habits (or behaviour).

Radio-telemetry equipment was ordered from the firm "Telonics" (Arizona, U.S.A) and by the end of November 1983, it was in use.
The radio transmiter is attatched to a carnivore-proof neck-collar and weighs 170 or 255 grams, sends out a constant signal of 148 MHz and a frequency of 148.001 to 148.900, with the theoretical lifespan of 18 → 20 months.

Radio-tracking was carried out on ground level, mainly from high topographical points, and also from a two-seater aircraft.

On the ground, a single 3-element "Yagi" hand-antenna was used.

A new 2 element "H-form" antenna was used later with greater success. With the aid of high-quality ear-phones the direction of the transmitter's signal could be established with greater accuracy.
Compass bearings, with an oil filled compass, were taken in the direction of the signal. The reception distance of the radio signals varied between 3 and 25 kilometers.

Using trigonometry, the position of each radio point was plotted on a 1:50 000 topographical map.
Regular practice sessions with transmitters on known points showed errors of a maximum of 400 m out (N = 24)

Radio-tracking from the official "Piper Club" two seater aircraft ~~take~~ took place on 4 occasions with a total flying time of 20 hours.
2 3-element "Yagi-antenna" were mounted at 45° of the wing supports, with a quater wave-length difference. With the aid of a switch, the operator in the plane can switch the signal from the right to the left antenna

As soon as the signal from one of the antennas is received, instructions are given to the pilot until the signal strength of both the antennas are equal and thus heading directly towards the transmitter.
The very clear increase in signal strength directly above the transmitter is followed up by low flying and the accurate position of the cheetah can then be established.
In less bushy areas, the cheetah can even be seen from the aircraft.

The territory size of the radio-collared cheetahs is determined with the use of the "minimum area method" as described by Mohr 1947 and since then used mostly for radio-tracking studies on carnivores. (Storm, 1965; Hornocker, 1973; Hamilton, 1976). Following this method, the territory size could be determined in the area by a convex polygon which is determined by joining all the outer radio points together.

With the exception of the first female, all the other cheetahs were caught next to a so-called "play-tree" with a double door trap-cage.
A circle of thorn-bushes, piled high, was made around the play-tree with only one opening in which the trap-cage was placed.
No additional locations were used as the cheetahs have a great desire to visit the play-tree. 11 out of the 13 cheetahs were caught in this way at the same play-tree.
The caught animals were drugged with "ketalar" (katamine hidrochloried, Parke-Davis) with a dosage of 6.5 ml/kg. administered intra-muscularly with a blow-pipe.
Each animal was weighed, all possible measurements taken and then marked with a radio-collar.
8 cheetahs that were caught during this period were killed.
The animals were first anaesthetised and then killed with an intravenous injection of "Euthalal".
The animals were weighed, measured and blood samples were taken and then a complete post mortem

was performed on each animal.
Tissue samples from the heart, liver, kidneys and muscles were taken and were sent, with a portion of the blood samples, to the Witwatersrand Medical School where the biochemical research on the structure and Synthesis of proteins of cheetahs & leopards is done.
The rest of the blood samples were sent to the local authority laboratary of Vetenary Services for complete analysis.
The University of Stellenbosch is at present undertaking complete hormone analysis.
The skeleton, stomach and reproductive organs were kept and will be used for age determination, diet and fertility (or fecundity) studies.

Dung samples were collected thaughout the study area on set routes, (and mainly at play-trees).
These samples will, in the coming year, be analysed with the stomach contents for indications of prey ratios and general diet.

. a complete plant study is being done at present by a botanist in the same study area. Their report will be made available as soon as it is completed.

The losses caused by both radio-collared cheetahs and unmarked cheetahs in the study area was mainly recorded with the help of the outstanding co-operation of the farmers.

The various farmers in the area let me know as soon as possible when a calf, a sheep or a goat went missing or when vultures were seen. An intensive search was then carried out to find the carcass. Because of the immensely dense bush areas, not all the carcasses were found. Those that were found, were investigated by observing the spoors (or tracks) and the type of capture-feeding method; and the predator could be identified.
Complete notes, sketches & photo's were taken of the capture-feeding type.
In cases where it was not done personally

use was made of the farmer's field observations and so those of his workers, who generally have a very good knowledge of spoors (tracks) and capture methods of carnivores.

Results

A total of 21 cheetahs were caught in the study area in the past 8 months. (See table 1).

13 Cheetahs were marked with radio collars and then released where they were captured: Of the 3 adult males that were caught together, one was later dead, and the other 2 moved and hunted together for 8 months; 2 solitary adult females; 2 solitary adult males; and a family of six. (adult female with 5 15 month old youngsters, of which one was female).

A further 2 cheetahs were marked with radio-collars and were translocated to Hardap Reserve in an experiment to see how reserve animals cope with "predator-circumstances".

One of the marked cheetahs was killed at the start of the project, after it was found in a trap cage. It was at a stage when there were no permanent staff members in the study area, and the involved farmer visited

the cages himself once a week.
2 of the marked males were killed after 8 months. In this time period, the 2 cheetahs had caught 6 calves and 19 boer goats. The 2 cheetahs were caught on 5 occasions with their prey in a trap-cage and everytime this happened, the involved farmer was prepaired to release them in the interests of the project. The large amount of stock which these cheetahs killed clearly showed that the 2 animals had become what is known as "conventional problem animals."
Due to the fact that no compensation for losses could be paid out to the farmers, it was decided to kill the animals to retain a good working relationship with the farmers.
These 2 cheetahs were thus over a period of 8 months intensively followed and a total of 137 radio points were received from them.
In this time period, the 2 cheetahs maintained a reasonable homerange

with a total surface of 133 km².
Only one clear "wandering" of 35 km in a North Western direction was recorded.

One adult female, with 2 10-month old cubs, was caught on the 6th of December on the farm "Schweizer-land" of Mr. Utg. This was the only cheetah that was not caught at a playtree. Because the cubs were too young to carry radio-collars, only the female was collared and then all 3 were released. This female is still being followed to date (31·10·1984) and 154 radio points have been recorded from her. The cubs moved away from her during July and it is unfortunate that it is unknown in which direction they moved and what has became of them.
During August, this female was seen from the aircraft with 3 cubs - 1→2 months old. ALMOST NO INTERBIRTH INTERVAL BECAME PREG W/ CUBS
In this period, the female moved over an area of 178.75 km² and had one "wandering" of 70 km. See fig. 5.

An adult male and female were caught and marked on the 8th and 7th of April (marking at playtree) at an old playtree (Boscia albitrunca) at Otjisauna North and were released on the 9th of April. The 2 cheetahs had little contact with each other even though their homeranges overlapped.
The male, which is still being followed, has up till now, a total of 93 radio points. His homerange is established as being 83.05 km² at this stage.
One "wandering" of 43 km has been recorded. See fig. 6.
The female was followed for 5 months but at the end of June was "missing" out of the study area and in spite of intensive searching in the study area and its surrounding areas, could still not be found.
The radio transmitter of the cheetah was picked up a month later in the Herero reserve "Ouitoto" approx. 85 km in a straight line from where the last known radio-point was taken.
An old Herero man tracked the cheetah down with his dogs, chased it up a tree and then shot it.
For some reason, (probably fear!) he

buried the collar at his hut.
The transmitter was heard from the aircraft 35km away and 8000 feet up, a huge compliment for the manufactures!!
During the 4 months, 65 radio-points were established by the female and she maintained a homerange of 148.5 km². Besides the 85km which she had moved preceding her death, the only other "wandering" recorded was of 62km. See fig 7.
The family of, 5 appox 15 month old cheetahs and their mother were caught at the same playtree at Otjisauna North between 23 and 26 of April. All 6 cheetahs were marked with radio-collars and the 26th and were then released. The 5 youngsters were collared with lighter radio-collars weighing 170 grams opposed to the bigger collar of 210 grams which the adults wear.
Up until the 21 June, the family moved together over a relatively widespread area of 137,5km². One big "wandering" of 93 km was undertaken by the whole family in a North-Easterly direction.

Does he say "wandering" ~~before~~ because they returned?

After the female moved away from her young, she kept a relatively constant homerange, to such an extent that it was presumed that she could have had cubs, but at this stage it is still not certain.

The 5 youngsters moved and hunted as a group for a period of 28 days over a very small area.

On appox. 25th of July, the youngsters seperated. The only female of the 5 youngsters has to this date (31.10.84) moved over a relatively constant area which is never more than 5 km away from where her mother's home range was.

The 2 were never seen together although their homeranges did overlap.

The 4 males disappeared from the area and could not be tracked from the ground despite intensive searches over a large area.

One of the young males was captured on 27 July on the farm "Okatjiho" of Mr. Borngreber, 115 km in a straight line from his last known position. A distance which he achieved

in less than 4 days. This cheetah was released and made his way, with a detour over Waldau, to Von Bach Reserve ~~we~~ where he stayed for approx. 3 weeks and then could not be found anymore.
About a month later, this cheetah was found again in the study area. He had thus made a semi-circle of more than 300 km in 2 months.
His 3 brothers were detected from the aircraft on the 14 August on the farm "Howell" 45 km directly North of "Okatjiho" where their brother, 2 weeks before, had been captured, and 120 km in a straight line from their last known position.
Between 4 and 8 September, these 3 males were caught on the same farm as their brother "Okatjiho".
As a result of very heavy losses of imported Blesbuck, the farmer was not prepaired to release these cheetahs on his farm, and so the cheetahs were set free in the region of Von Bach.
The 3 cheetahs have since been found on a farm 35 km directly North of Von Bach Reserve (See figure 8.)

The 2 cheetahs that were marked with radio-collars and translocated to Hardap Reserve, moved out the reserve after 6 days at the place where the fishriver flows into the Hardap Dam; and where the fence had been washed away. Since then, the cheetahs were tracked on 2 occasions from the aircraft on boundary farms 15 and 5km North of the Reserve.

14 of the 21 cheetahs that were captured were caught at the same playtree (Acacia reficiens) on Otjisauna North. One radio-collared cheetah was caught again in the same trap 2 days after he was last caught. As far as can be established, none of the other cheetahs ever came back to that playtree again.

As far as can be determined, 44 cattle calves, 33 boergoats and 11 sheep in the study area were caught by marked and unmarked cheetahs. This area comprises about 10 farms and has the greatest concentration of marked cheetahs.

Tables 5 and 6 give complete indications of the stock losses on the farms

with an indication of the total stock numbers in the area during that time period.
The various farm owners all agree that these figures, as far as can be determined, are accurate.
Only one farmer in the entire area, Mr. D. Metzger of "Otjisaura North" and "Zwerveling" keeps complete written records of the stock numbers on his farm, of births and mortalities ("natural", sickness or predation).
Seeing that all the cows calve in the veld, and that there are many herds which calve at the same time, and the relatively small number of farm workers, it is impossible that the cause of death for every calf can be determined. It can be said with relative certainty that all calves which are dead at, or just after, birth are due to Natural factors: dead of weakness or some or another defect or deformality.
Those calves which are too weak to follow the cow and the herd, are caught by the smaller predators, especially by jackels. As soon as the calves are older than a week or two,

· they are recorded by the farm workers, and from that stage onwards, the cause of death can be determined with relative certainty.
In table 7, a complete record of the births, mortalities as well as the complete cattle numbers of the farms "Otjisauna North" and "Zwerveling" is given. Mr. Metzger agrees that the numbers of "dead and missing" are mainly due to natural causes and a few newly born calves (apprently weak) were eaten by Jackels.
Mainly due to the shortage of staff, almost no attention was given to the natural prey ratios and numbers, and as already mentioned, the study concentrated mainly on movements.
6 incidents of natural predation with the aid of spoor tracking were recorded. All 6 of the animals were between the ages of 2 and 8 months old.
4 were hartebeest calves and 2 were Gemsbok.
Spoor indications of unmarked cheetahs in the home ranges of the radio-collared animals are continously recorded and indicated on a map.

} Survey data

This was recorded through personal observations as well as by observations of the various farmers and their workers. See figure 10.

Disaussion

The 12 cheetahs that were marked with radio-collars and which were followed these past 8 months, have provided very valuable information regarding the home ranges and territories.
The 12 predators were a good representative sample of the social groups of the natural cheetah population.
Males that move and hunt together; solitary males and females and females with dependant young.
This is also the 3 main groupings of a cheetah population as described by Labuschagne, 1973 of the cheetahs in the Kalahari-Gemsbok Park, and also by Eaton, 1974 of his studies in the Serengeti National Park in East Africa.
Before comparisons can be made with other studies, it is important to emphasize that this present study

on the ecology and movements of cheetahs, is the first study of these predators done outside of a reserve.

The cheetah population of S.W.A / Namibia, today one of the two greatest and healthy populations in the world, occurs mainly in farm areas.
Only small populations occur in reserves and protected areas, with less than 200 in Etosha National Park, and less than 300 in the traditional areas such as Damaraland, Kaokoland and Bushmanland.
Furthermore, the cheetah is regarded by farmers in the central and Northern districts as the biggest problem animal, and apparently responsible for great financial losses of especially cattle and game farmers. In this area, the cheetahs are continuously and intensively hunted and killed.
And furthermore, the habitat of the cheetahs in this country is far different from the populations in the big conserved areas elsewhere in Africa: no natural, tradional enemies of the cheetah; lion, hyaena or wilddog occur in these farmlands, many waterpoints

& the large expanse of fences and camps on the farmlands.

The territories found so far in this study of the various social groups of Cheetahs, indicates that the Cheetahs in these areas are <u>not</u> strongly territorial.

This corresponds or agrees with almost all other studies of cheetahs done in protected areas in East Africa and also in Kalahari-Gemsbok National Park. (Schaller, 1970; Eaton, 1973; Labuschagne, 1979). See Table 2 and 3.

The Cheetah is thus unlike the "Bergleeu" (meaning is varied: mountain-lion, puma or cougar), (Hornocker, 1970) and the lion (Eaton, 1972) in using territoriality to regulate population numbers. Other Ecological factors must therefore be responsible here.

In spite of the great degree of overlapping in the study area, the cheetahs avoid contact with each other. No two groups of solitary Cheetahs were ever encountedred together at the same radio point.

The "Time-plan territory" as described by

Eaton, 1970, is thus possibly also applicable here. According to this, cheetahs that come across fresh spoors or dung (ie 24 hours old) will change their course. Markings older than 24 hours will be ignored. Further research is necessary to confirm this theory for this area.

In the past 8 months there was a total of 16 permanent cheetahs (7 adults and 9 subadults) as well as 20 "temperary" cheetahs in a 585 km² portion of the study area, where the radio-collared cheetahs mainly moved. Permanent cheetahs were regarded as all the animals that were marked with radio-collars and then released again; while "temperary" cheetahs were regarded as those which were personally seen or of which spoors were seen in this period. As far as possible it was attempted to reduce possible "double-observations" and so an absolute minimum of 20 temperary cheetahs were recorded.

See table 4 for the density calculations, and the densities of other studies.

As the table clearly shows, the density of cheetahs in the present study can be regarded as one of the densest cheetah populations, as only the Nairobi National Park with 1:3-6 km has a more densely populated area.

The immensely long distances which the newly independant young travel in search of new territory, as far as 270 km, is probably a further proof of the high density of cheetahs in the surrounding areas. Virtually no information is available from any other studies on the distribution of young cheetahs which become independant.
This aspect is of the greatest importance for the key question in this study: the population size of the cheetahs in S.W.A / Namibia.
Consequently, a programme for the intensive capturing, marking and releasing of dependant sub-adults over a greater area is being planned in the coming year.

losses

The losses in Table 5 and 6, orginates from the 10 farms where the radio-collared cheetahs mainly moved and from where regular information an stock-losses were received throughout the year, and were as accurate as possible.

Therefore, it is estimated that each of the 10 farms had an average loss of 3 calves in the past 8 months due to cheetah predator.

Of the 25 calves that were caught by leopard, 20 calves on 2 neighbouring farms were caught by a specific leopard predator group of leopards. A female with ~~her~~ her 3 dependant young, were for a period of 3 months responsible for wounded animal the losses. The female was ~~apprently~~ apparently caught in a leg-hold trap in the past and with her escape had lost 2 nails from her left-hind leg. This was clearly seen in the spoors at the kill, and was therefore identified as the culprit.

The average of 3 calves per farm per year, caught by cheetahs, is considerably less than the "generally accepted losses",

Which are one the whole reported by the farmers. The relevent farmers in the area all agree that an average loss of 3 → 5 calves occur every year. However, exceptions do occur.
For example, one farmer in a near-by area, lost 43 calves in one year. But it was the first time in 12 years that he had lost more than 4 calves.

40 goats out of a total of 316 on 4 farms, and 8 sheep out of 127 on 2 farms were caught by cheetahs in this time period. It is also clear and understandable that boer goats and sheep are alot more susceptable to cheetah predation.
These animals are usually kept on a small scale in this area, as cattle and game farming remains the main income.
The study area has a relatively big and healthy game population with especially hartebeest, gemsbok and kudu (see annual report 1984 by Mr. G. Jordaan).

It is thus possible that higher stock losses occur in areas with less game. In the coming year, an intensive study on the stock losses over a much bigger area will be undertaken.

It is interesting and important to note that there was no evident increase in the stock-losses in the immediate surrounding areas where the 21 radio-collared cheetahs were released. The 2 cheetahs that did indeed begin to catch more calves, is also proof that cheetahs can become "conventional problem animals."
It would be interesting to compare the stock-losses in the study area with neighbouring areas where cheetahs are often caught and destroyed. Is it possible that the vacuum created here, could cause more cheetahs and greater stock-losses than in a stable permanent population ?!!

The world ban of the I.U.C.N in 1975 on the trade of cheetahs and cheetah products, has a serious and

distressfully negitive impact on the cheetah population of S.W.A / Namibia.
The farmer which in the past, caught the problem animal in a trap-cage, sold it live to a game-trader as he would thus receive a compensation for his losses.
Today, no game trader can accept cheetahs, despite a big international demand for live animals for zoos and breeding stations.
The farmer also has to have a permit from the Nature Conservation Directorate to be able to keep the skin.
The result is that all the farmers simply shoot and bury the cheetahs.
Besides Etosha National Park, which already has a sensitive cheetah population, the directorate has no other game reserves suitable for the translocation of cheetahs. With the I.U.C.N ban, it is virtually impossible to transport these cheetahs to the republic.
Farmers that catch cheetahs live, are now advised by the directorate to destroy them. This has again lead to a serious breakdown of the trust

and communication between farmers and Nature Conservation, in the past 3 to 4 years. Approval was given by Nature Conservation to hunt cheetahs for trophies, for a trial period. This allows the land-owner to receive compensation for losses from a fee of R 1000 per cheetah. This did not have any significant result over the past 2 years. See Table 8. The reasons for this failed attempt can be ascribed to 2 factors: The most important that: The present approval is only a local approval and it is not at all approved by International Conservation Organisations. Therefore, no cheetah trophies can be legally exported to any member countries. The immensly shy character of the cheetah, and the relatively inexperienced hunters, makes this animal very difficult to shoot. In spite of the great communication gap and distrust between farmers and Nature Conservation, there are still farmers who are prepared, at their own

cost and financial loss, to make big sacrifices, only for the eventual success of this project. It must be emphasised that the sucess that was achieved thus far with the project is solely thanks to these sacrifices made and the co-operation of the farmers in the study area. Without this, the project would never be able to take place.
It is ironic though that the International organisations, which today regard the Cheetah as one of their main priorities, and the local directorate of Nature Conservation, which regards this project as one of the most important, fail to give any acknowlegment to these few farmers in the study area for their contributions.

Figure 1: The location of the Study Area.

FIGUUR: 1

LIGGING VAN DIE STUDIE AREA

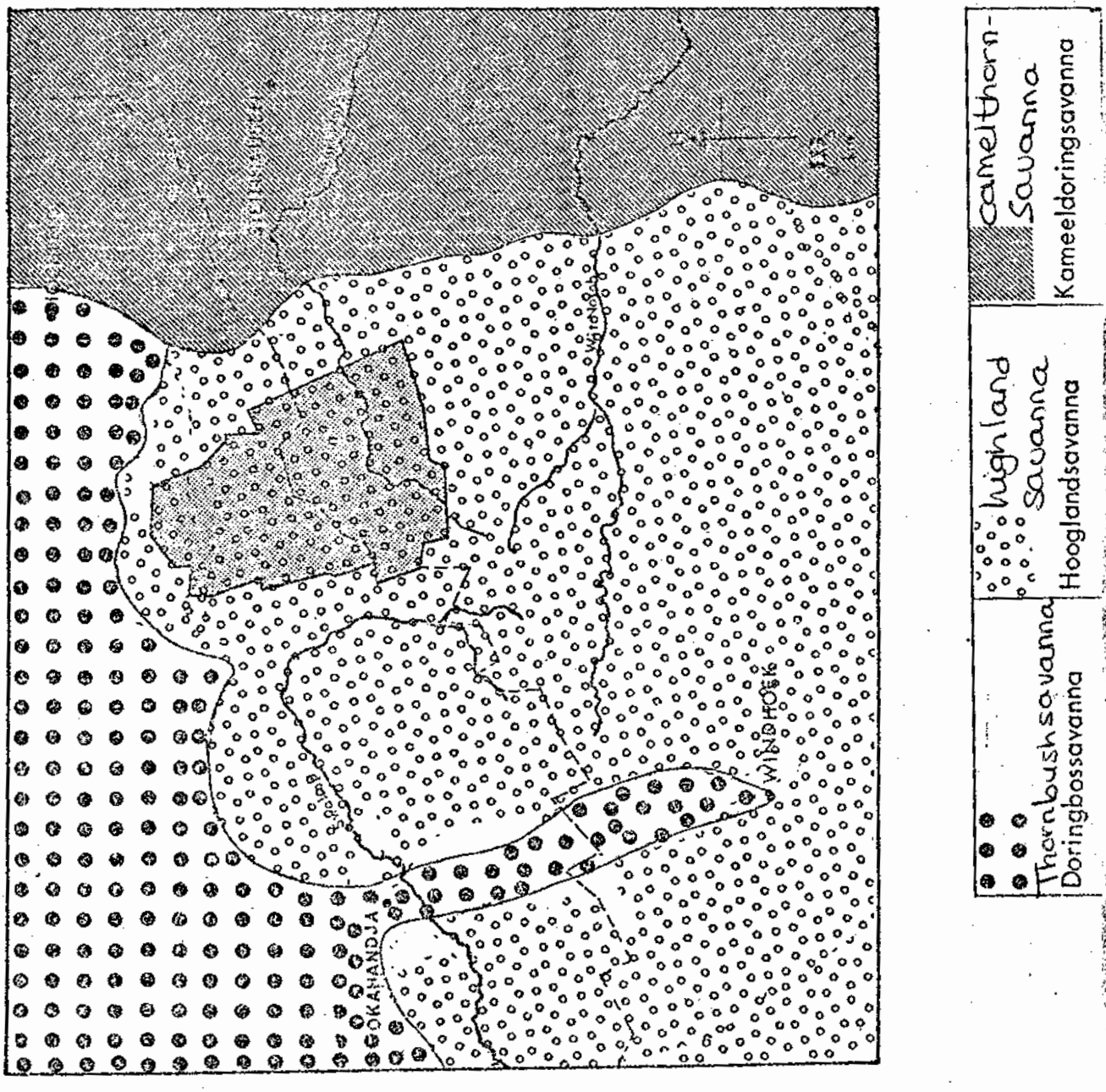

Figure: 2 Vegetation Map of the study Area and surroundings according to Giess, 1970.

FIGUUR: 2

PLANTEGROEI- KAART VAN DIE STUDIE AREA EN ONMIDDELIKE OMGEWING VOLGENS GIESS, 1970.

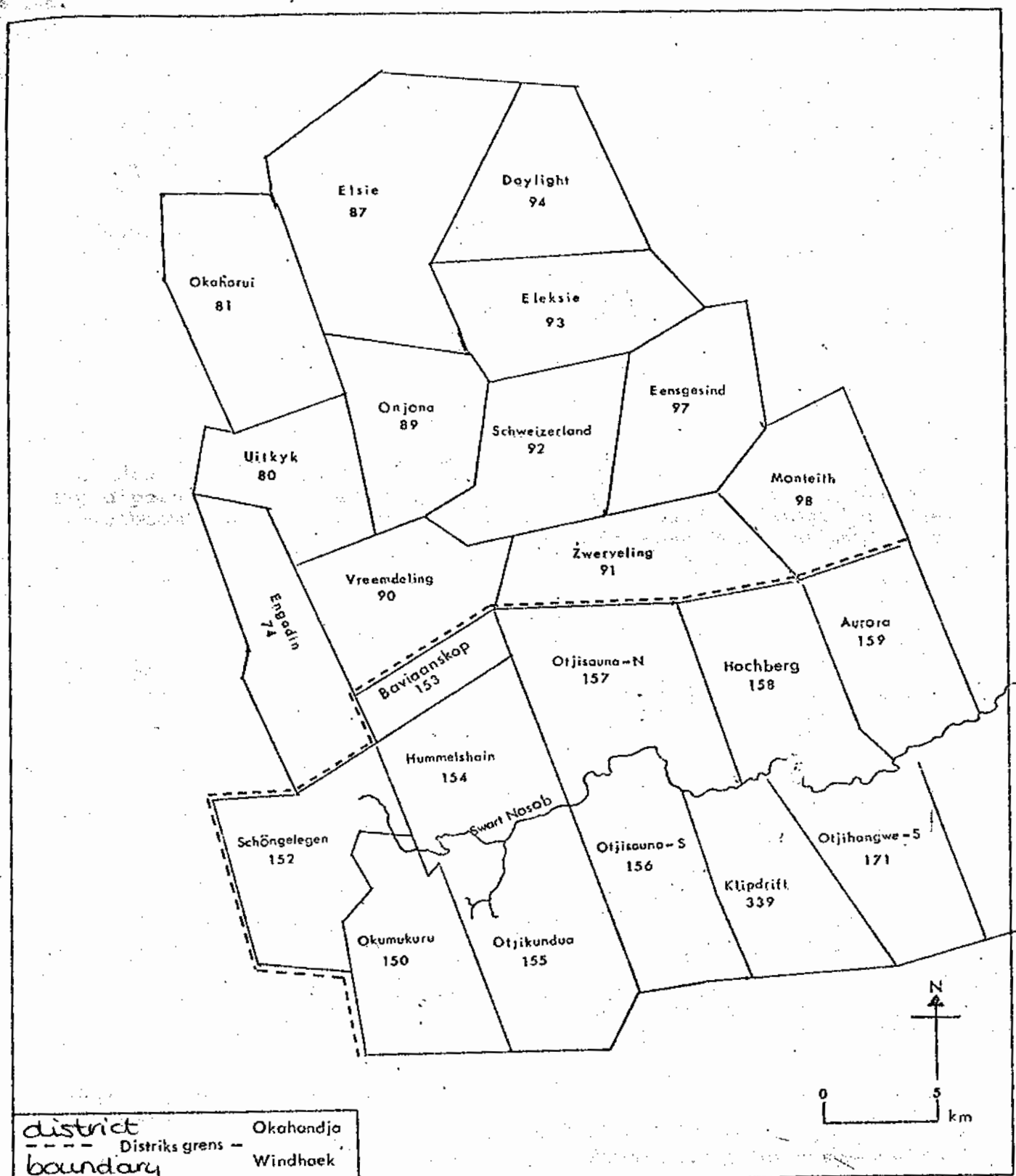

Figure 3: The study area which comprises 20 farms and which falls within 2 districts.

FIGUUR: 3

DIE STUDIE AREA WAT UIT TWINTIG PLASE BESTAAN, EN IN TWEE DISTRIKTE GELEE IS.

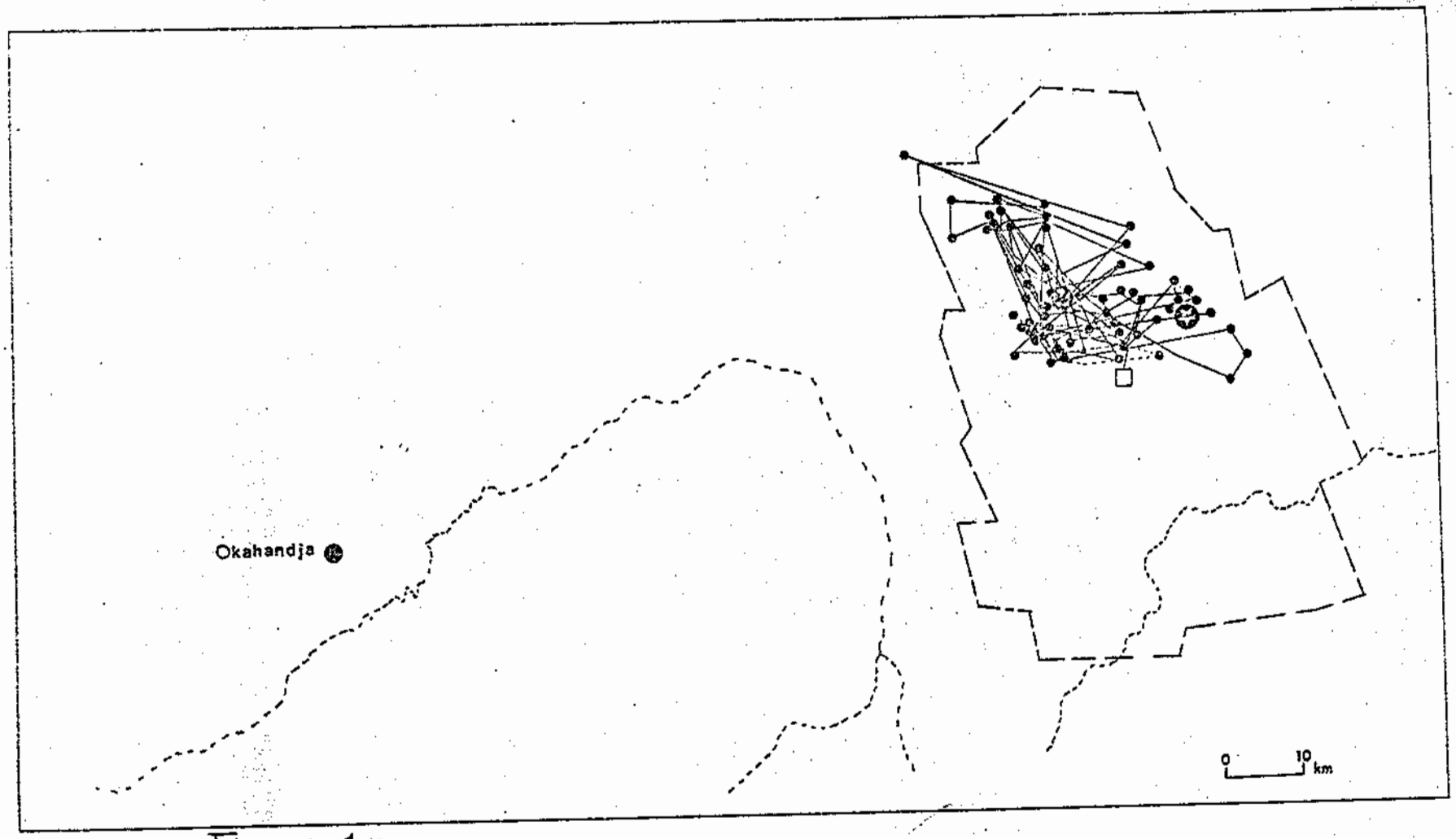

Figure 4:
Movements of the 2 radio-collared males
from 7|4|84 to 30|9|84
2 6 mos

FIGUUR: 4

BEWEGINGS VAN DIE TWEE RADIO- GEMERKTE MANNETJIES VANAF 7/4/84 TOT 30/9/84

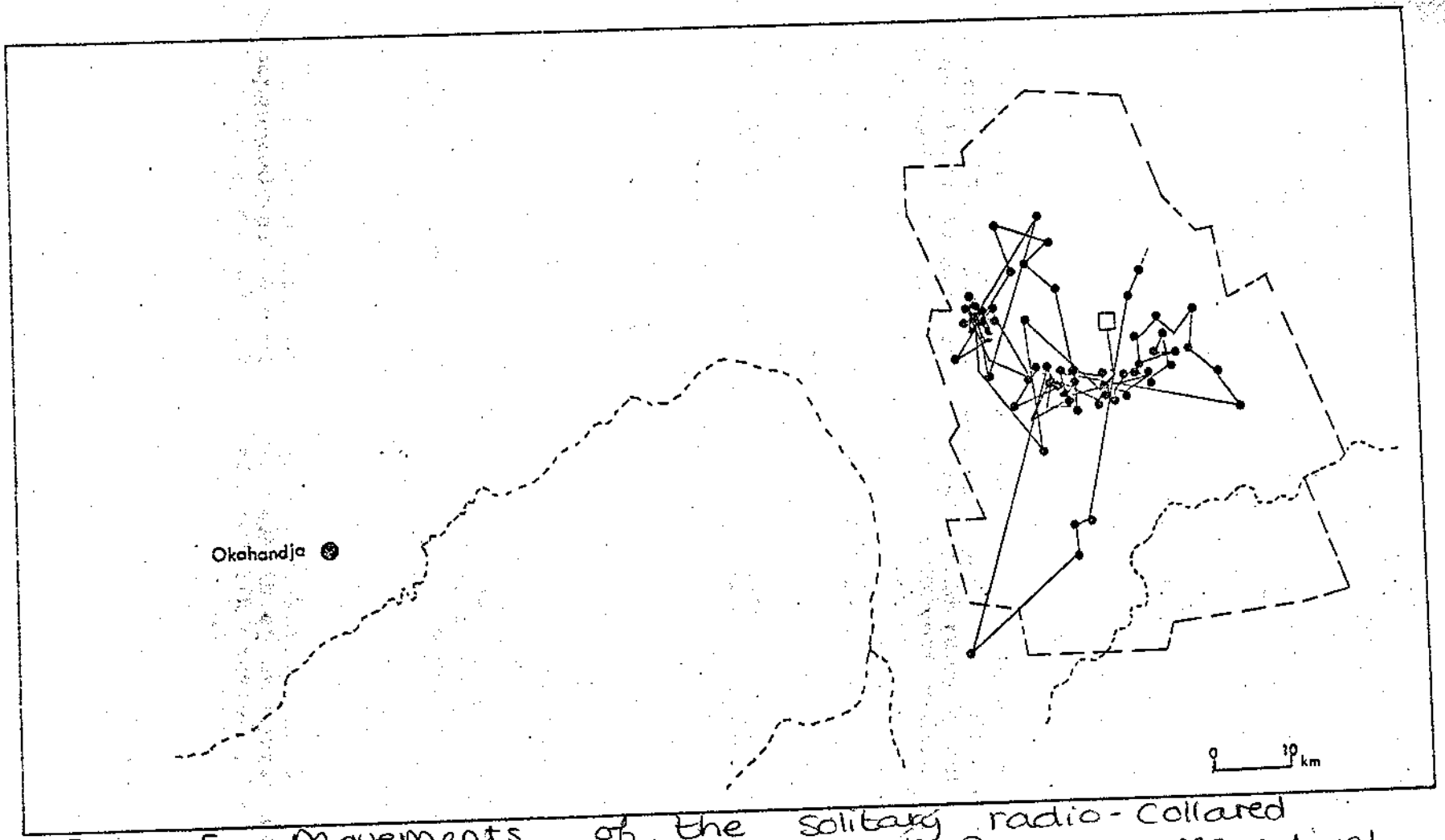

Figure 5: Movements of the solitary radio-collared female with her 2 and 3 young respectively from 6/12/83 to 30/9/84

2 9 mos

FIGUUR: 5

BEWEGINGS VAN DIE RADIOGEMERKTE ALLEENLOPENDE WYFIE MET ONDERSKEIDELIK 2 EN DRIE KLEINTJIES VANAF 6/12/83 TOT 30/9/84.

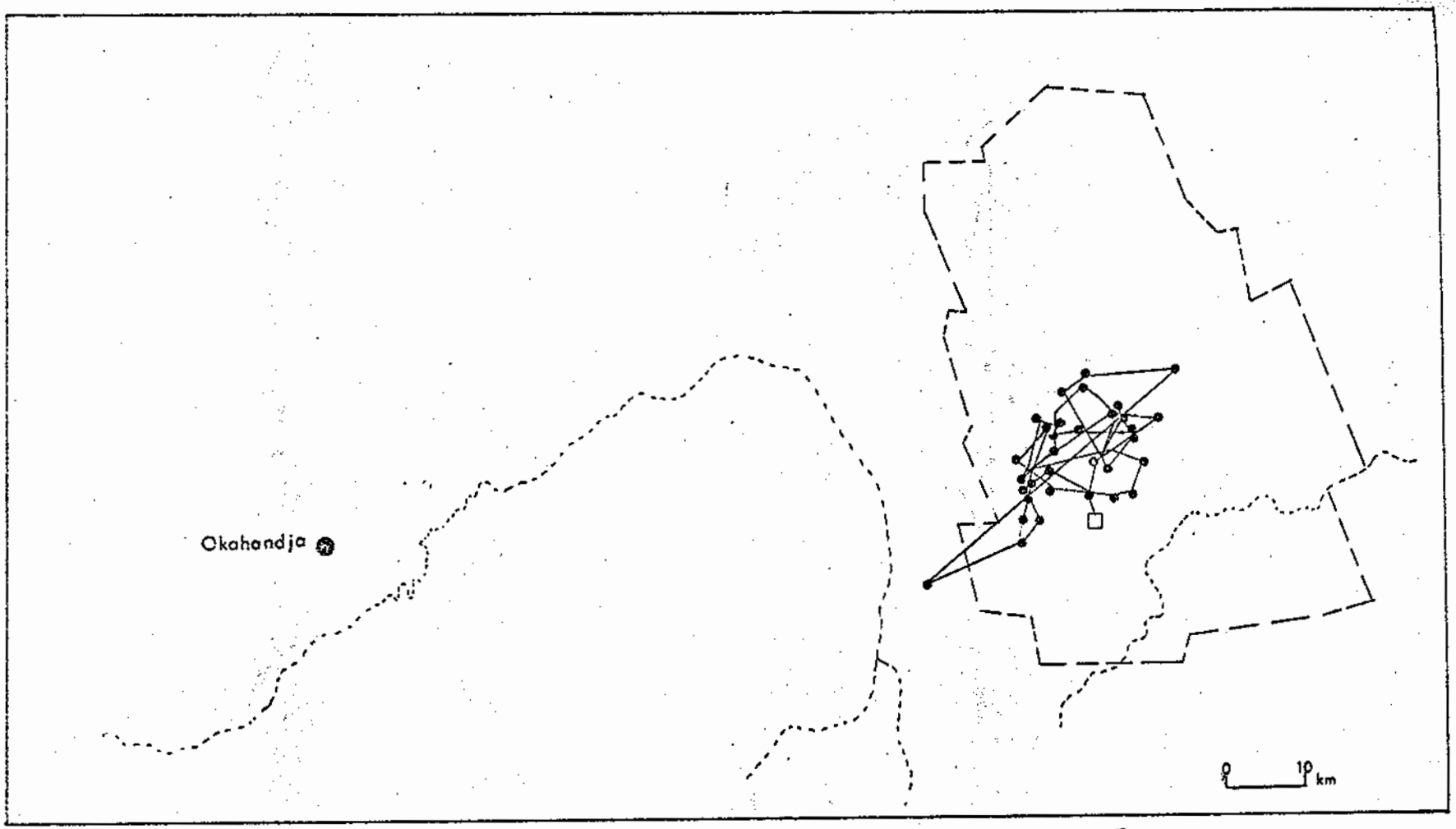

Figure :6 Movements of the Solitary Radio-collared male from 7/4/84 to 30/9/84

2 6 nos

FIGUUR: 6

BEWEGINGS VAN DIE ALLEENLOPENDE RADIOGEMERKTE MANNTETJIE VANAF 7/4/84 TOT 30/9/84

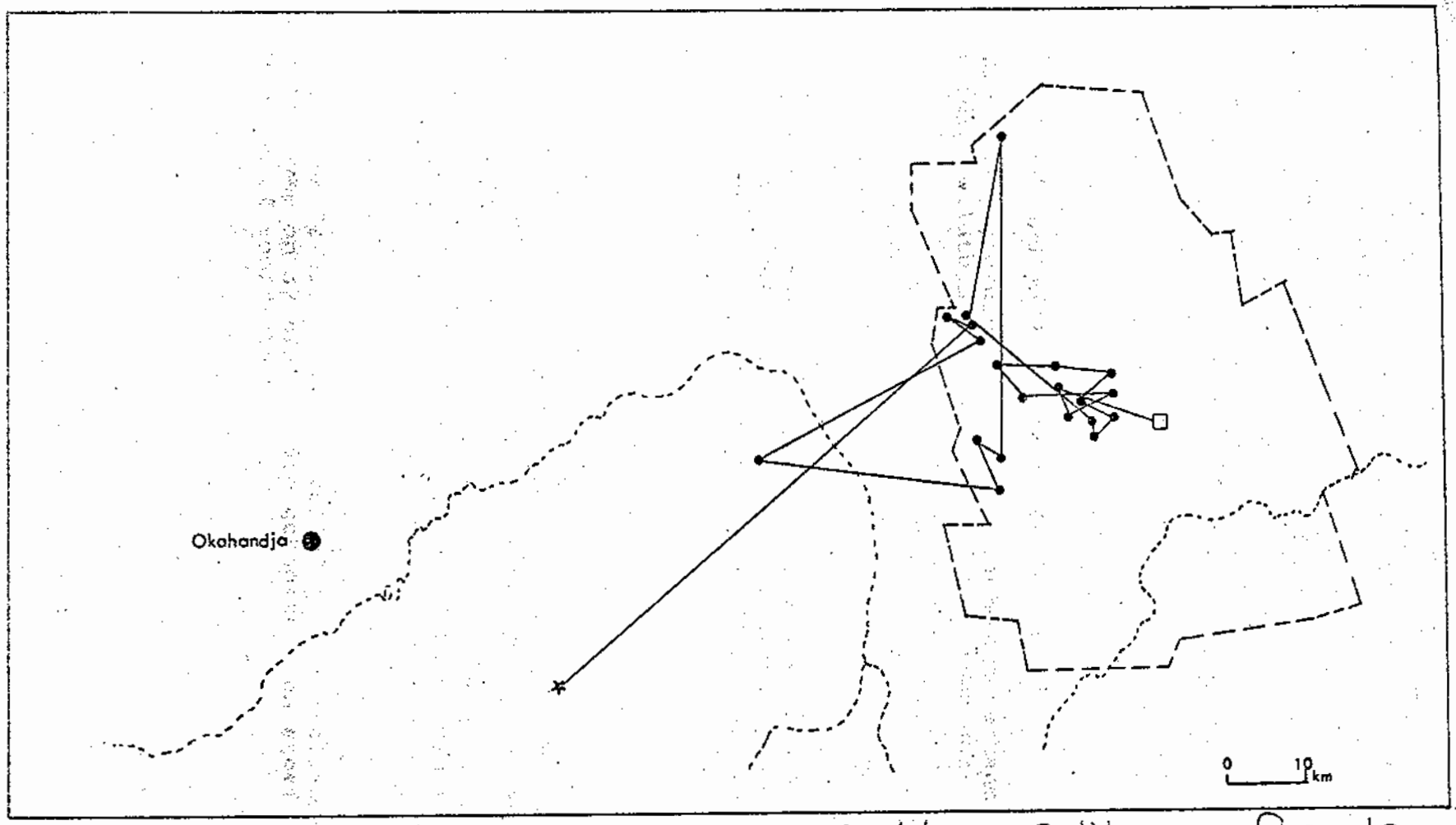

Figure :7 Movements of the solitary female from 9|4|84 until her death in the Ovitoto Reserve on the 15|7|84

FIGUUR: 7

BEWEGINGS VAN DIE ALLEENLOPENDE WYFIE VANAF 9/4/84 TOT HAAR DOOD IN DIE OVITOTO RESERVAAT OP 15/7/84

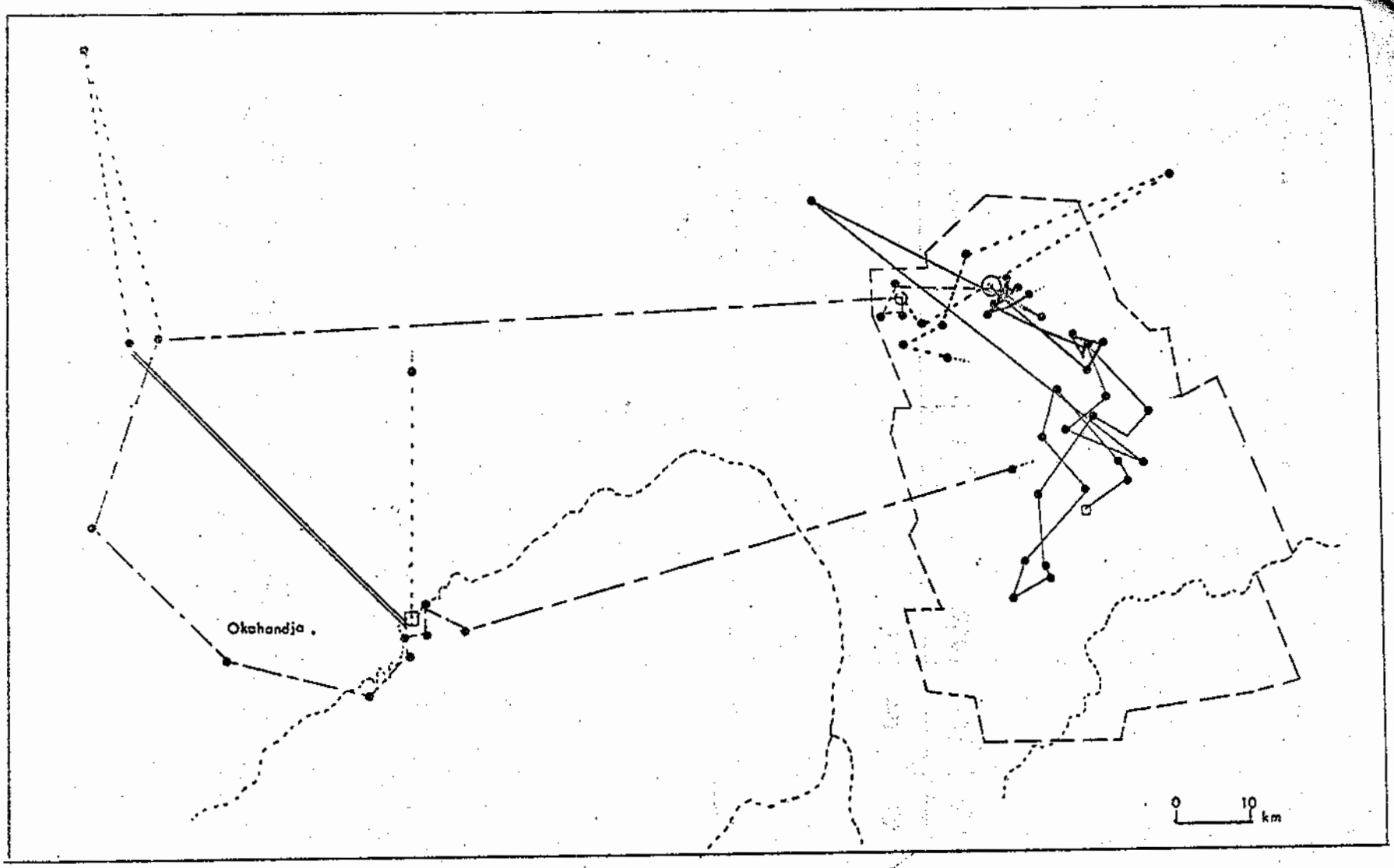

Figure 8: Movements of the radio-collared family, the female with her 5 young which split up on the 26/4/84

FIGUUR: 8

BEWEGINGS VAN DIE RADIOGEMERKTE FAMILIE, DIE WYFIE MET HAAR VYF KLEINTJIES WAT OP 26/4/84 UITMEKAAR BEWEEG HET, EN DIE

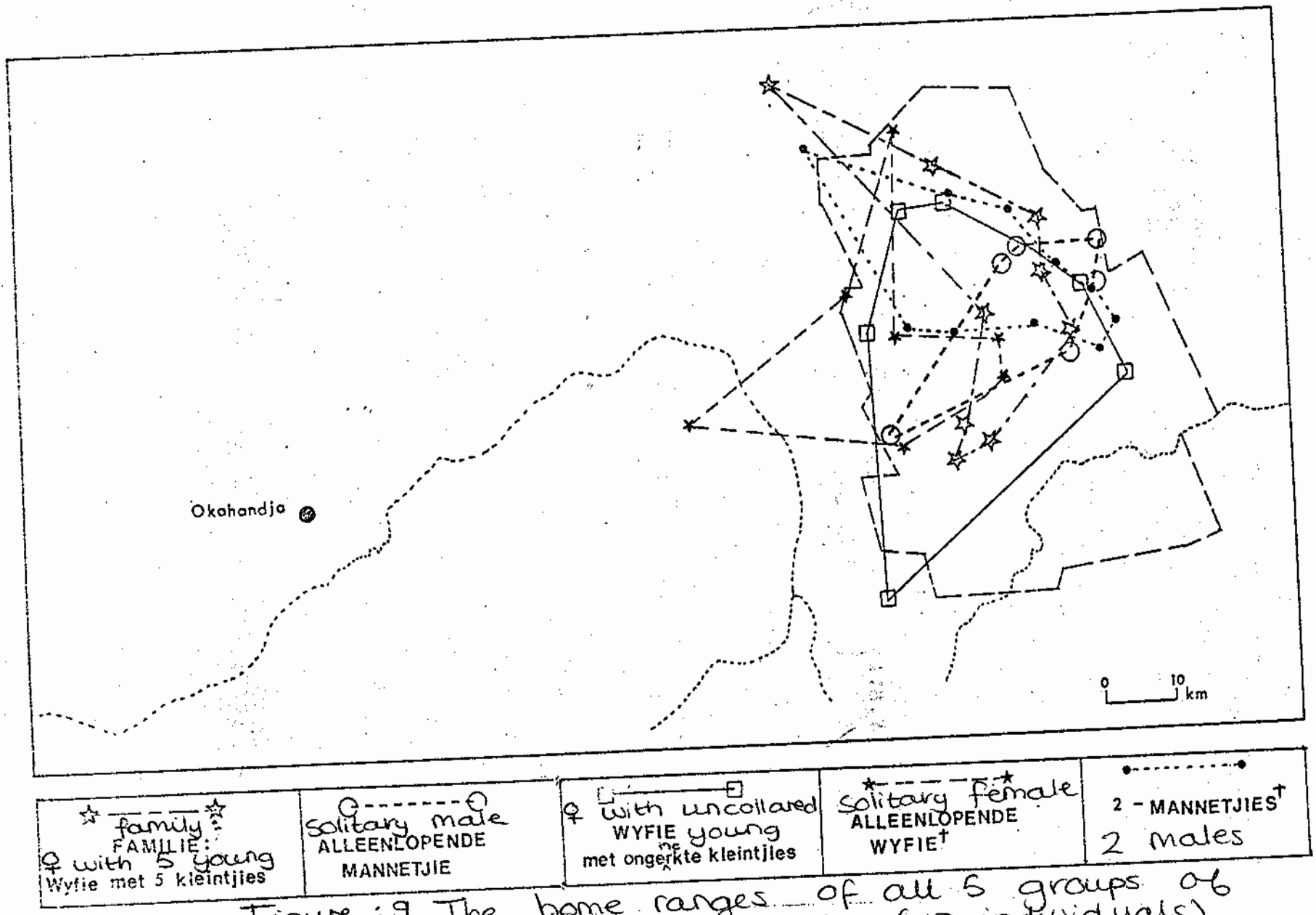

Figure: 9 The home ranges of all 5 groups of radio-collared cheetahs (13 individuals)

FIGUUR: 9 DIE BEWEEGAREAS VAN AL DIE 5 GROEPE RADIOGEMERKTE JAGLUIPERDS (13 INDIVUDUE).DI

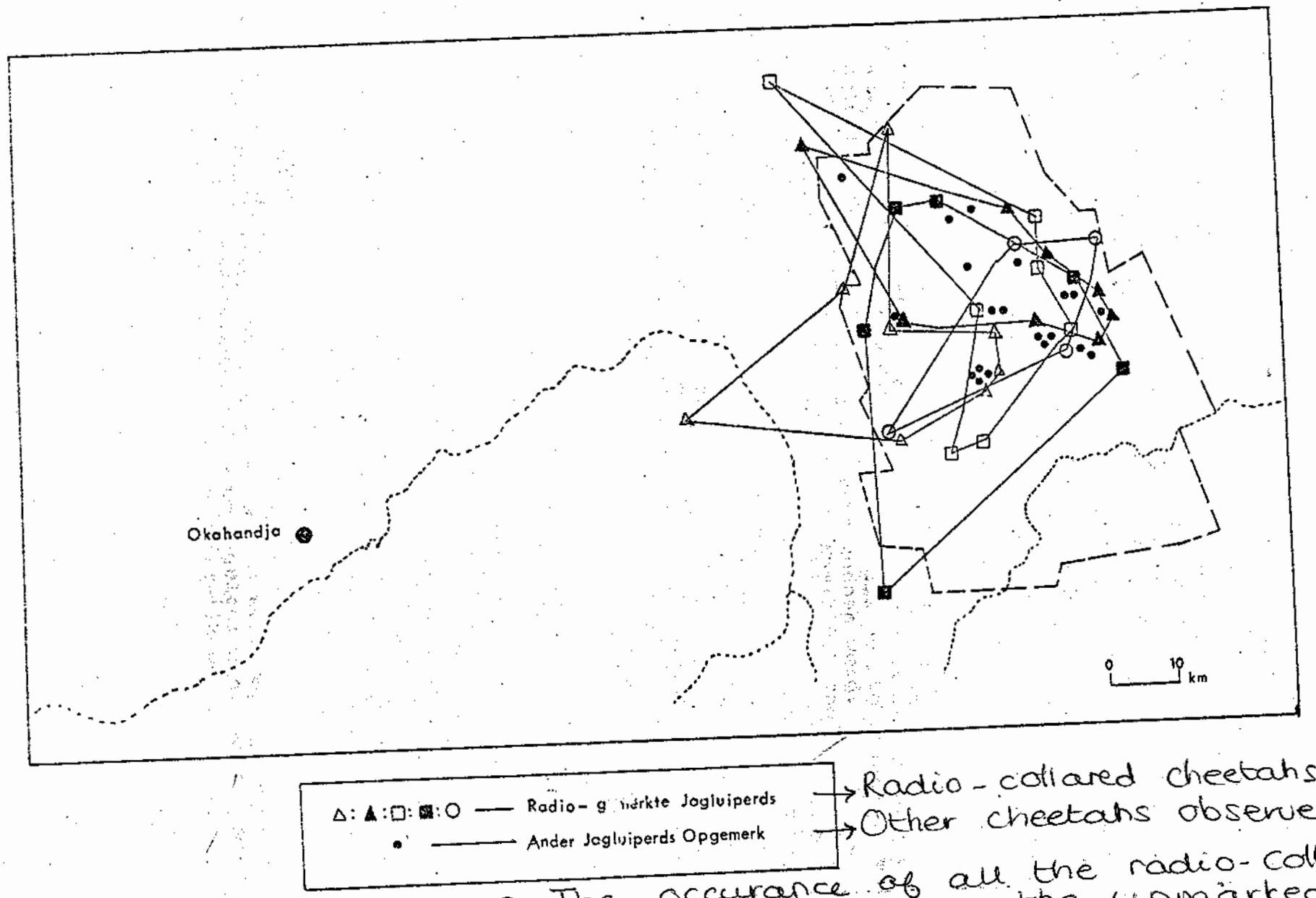

Figure: 10 The occurance of all the radio-collared animals as well as the unmärked animals in the study area over the past 8 months.

FIGUUR: 10

DIE VOORKOMS VAN ALLE RADIOGEMERKTE SOWEL AS ONGEMERKTE JAGLUIPERDS IN DIE STUDIE AREA IN DIE AFGELOPE 8 MAANDE.

Table 1:

Data of the 21 cheetahs caught in the past 8 months in the Study area.

TABEL 1

Data van die 21 jagluiperds in die afgelope agt maande in die studie area gevang.

Date of DATUM GEVANG capture	PLEK location	GESLAG Sex	OUDERDOM age	radio RADIO PUNTE points	post POST MORTEM mortems
6/12/83	Schweizerland in a river Schweizerland In rivierloop course.	1 ♀ 2 ♂	adult Volwasse Onvolwasse Subadult	154	/
21/12/83	Otjisauna - N main playtree Otjisauna-N "Hoofspeelboom"	3 ♂	Volwasse adult	137	1 - 11/1/84 2 - 13/9/84
7/4/84	Otjisauna - N Otjisauna-N WitgatSpeelboom Witgat playtree	1 ♂	Volwasse adult	93	/
8/4/84	Otjisauna-N Witgatspeelboom Witgat playtree	1 ♀	Volwasse adult	65	DOOD - OVITOTO 15/7/84
23-26 /4/84	Otjisauna-N "Hoofspeelboom" main play tree	1 ♀ 4 ♂ ? ♀	adult Volwasse Onvolwasse subadult	52	/
9-11 /5/84	Hummelshain Speelboomplaytree	2 ♂	Volwasse adult	/	15/7/84
23-24 /5/84	Hummelshain Speelboomplaytree	2 ♂	Volwasse adult	/	26/7/84
9/6/84	Otjisauna-N "Hoofspeelboom" main playtree	1 ♂	Volwasse adult	/	11/6/84
16-17 /8/84	Otjisauna-N "Hoofspeelboom" Otjisauna-N main playtree	2 ♂ Volwasse adults - Verplaas na HARDAP - translocated to Hardap.			

TABEL 2

Die tuisarea groottes, in vierkante kilometer, en die totale periode van agtervolging van die ELF radiogemerkte jagluiperds in die studie area. Die tuisarea grootte sluit die"uitwandelings" in.

Table 2 : The territory sizes, in square kilometers, and the total period of following of the 11 radio-collared cheetahs in the study area.

JAGLUIPERD GROEP Cheetah group	TYDPERK VAN AGTERVOLGING period of following	TUIS AREA GROOTTE territory size
2 adult males Twee volwasse mannetjies	21/12/83 tot 13/9/84	133.2 km^2.
One adult ♀ Een volwasse Wyfie met 2 en later 3 onvolwasse kleintjies	with 2 and later 2 young. 6/12/84 tot 30/9/84	178.75 km^2.
Solitary adult Alleenlopende Volwasse Mannetjie	male. 7/4/84 tot 30/9/84	83.05 km^2.
Solitary adult Alleenlopende Volwasse Wyfie	female 9/4/84 tot 15/7/84	148.5 km^2.
Family group: Familiegroep Ma met 5 kleintjies	Mother with 5 young 26/4/84 tot 24/7/84	137.5 km^2.

The territory sizes include the "wanderings".

Table 3

A comparison of the various territory sizes determined in the various studies

TABEL 3

n Vergelyking van die onderskeie tuisarea groottes soos bepaal deur die verskeie studies.

Reference VERWYSING	PLEK location	Size of territory TUISAREAGROOTTE
Schaller, 1970.	Serengeti N.P. Tanzanie.	65 km².
McLaughlin, 1970.	Nairobi N.P. Kenya.	80 - 100 km².
Labuscagne, 1979.	Kalahari-Gemsbok N.P. Suid- Afrika. South Africa	300 km².
Huidige Studie, 1984. Present Study, 1984	S.W.A./Namibie.	83 - 178 km².

Table 4

A comparison of the cheetah population densities as determined in the various studies.

Tabel 4

n Vergelyking van die digtheid van jagluiperd populasies soos bereken deur die onderskeie studies.

VERWYSING Reference	PLEK location	DIGTHEID density
Schaller, 1970.	Serengeti N.P. Tanzanie.	102 - 127 km².
Eaton, 1973.	Nairobi N.P. Kenya.	3 - 6 km².
Labuschagne, 1979.	Kalahari-Gemsbok N.P. Suid- Afrika.	64 km²
Pienaar, 1963.	Kruger N.P. Suid- Afrika.	72 km².
Huidige Studie, 1984. Present Study, 1984	S.W.A./Namibie.	16.3 km².

Table 5

A summary of the total stock-losses from January 1984 until 31 October on 10 farms in the Study area.

TABEL 5

n Opsomming van die totale vee- verliese van Januarie 1984 tot 31 Oktober op TIEN plase in die studie area.

PLAAS farm	losses VERLIESE BEES cattle	BOK goat	SKAAP sheep	Total no. stock on farm during this period. TOTALE AANTAL VEE OP PLAAS GEDURENDE DIE PERIODE. BEES	Kalwers calves	BOK goat	SKAAP sheep
Eensgesind Monteith	0	5	/	600	135	150	/
Schweizerland	5	19	/	310	70	130	/
Vooruitgang	15	8	3	600	145	25	40
Uitkyk	14	1	8	183	60	12	127
Vreemdeling	3	/	/	125	25	/	/
Hummelshain Baviaanskop	4	/	/	135	35	/	/
Otjisauna-N Zwerveling	5	/	/	776	282	/	/
TOTAAL Total	46	33	11	2729	757	317	167
% VERLIES % losses	6.07	10.4	6.58				

Tabelle 6: The total number of calves (cattle) caught by cheetah and leopard on the 10 farms.

TABEL 6

Die Totale aantal beeskalwers gevang deur Jagluiperd en Luiperd op die Tien plase.

PLAAS farm	cheetah JAGLUIPERD	leopard LUIPERD
Eensgesind Monteith	0	0
Schweizerland	4	1
Vooruitgang	6	9
Uitkyk	3	11
Vreemdeling	2	1
Hummelshain Baviaanskop	4	2
Otjisauna Nord Zwerveling	4	1

TOTAAL: total:

	GEVANG caught	KALWERS GEBORE calves born	% VERLIES % losses
cheetah Jagluiperd	23	747	3.1
leopard Luiperd	25	747	3.3
total: TOTAAL	48	747	6.4

Table 7 The total number of calves lost during the period 1/1/1984 to 30/10/1984 on the farms Otjisauna North and Zwerveling.

TABEL 7

Totale aantal kalwers verloor gedurende die periode 1/1/1984 tot 30/10/1984 op die plase Otjisauna Nord en Zwerveling.

OORSAAK VAN DOOD Cause of death	AANTAL DOOD no. of deaths	%: losses / total number %: Verliese/ of calves Totale aantal kalwers gebore N = 282 born.
Dood en Vermis Dead and missing	11	3.9
Gebrekkig en Swak flawed (or ill-conceived) and weak.	3	1.06
Hondsdolheid Rabies	5	1.77
Siek en Geslag sick and slaughtered.	1	0.35
Karkas nie Gevind carcass not found	2	0.70
Gevang deur Jagluiperd en Luiperd. predation by cheetah and leopard	5	1.77
Totaal total	27	9.5

Percentages of the various losses over the total loss.

PERSENTASIE VAN DIE VERSKEIE VERLIESE TEENOOR TOTALE VERLIESE

Natuurlike Oorsake Natural causes	74%
Karkas Vermis carcass missing	7.4%
Jagluiperd Predasie cheetah predation	14.8%
Luiperd Predasie leopard predation	3.7%

Table 8 : A summary of the permit applications to hunt cheetahs as trophies and to export the products, for the period 1/1/1983 to 30/9/1984

TABEL 8

n Opsomming van die permit aansoeke om jagluiperds as n trofee te laat mag skiet en die trofee uitgevoer, vir die tydperk 1/1/1983 tot 30/9/1984.

	1983	1984
application to shot cheetah as a trophy AANSOEKE OM JAGLUIPERD AS N TROFEE TE MAG SKIET	69	34
TROFEE UITGEVOER trophy export	18	1

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