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Abstract: The document is the progress report of the research project on the behaviour, ecology and movements of the cheetah on farm areas in Namibia for the period between November 1985 to October 1986. Estimation of the number of cheetahs on farmlands, based on basic information on the species' movements and density, is between 2000 and 3000, remarkably less than the number of about 6000 that was estimated through questionnaires and personal communications. From this study it was found that the average loss of cattle due to cheetah predation is three to four calves per farm per year. The few farmers which actually did keep good written records of all calf births and mortalities, had almost always much less losses due to predation by cheetahs. Recommendations include the increase of the cheetah's economic value for farmers, the establishment of reservoir areas that must include a number of farms and where the farmers must agree that a calf loss of 3 to 4 calves a year is acceptable, and an intensive, fulltime study to make an accurate conclusion of the stock losses. Annexes figures of the movements of the studied cheetahs are given, as well as tables indicating their home range area estimations, stock losses on farms, and departmental permit records for the cheetah between 1980 to 1986.

THE BEHAVIOUR, ECOLOGY AND MOVEMENTS OF CHEETAH ON THE FARM  
AREAS OF SWA /NAMIBIA.

PROGRESS REPORT ; OCTOBER 1986

PROBLEM ANIMAL RESEARCHER ; D.MORSBACH

## INTRODUCTION

This is the research project progress report for the period November 1985 to October 1986.

The fieldwork phase of this project was completed in August 1986. At present work is being done on the analysis of the faecal samples (collected during the field work phase), the final analysis of the data and the composition of the final project report. During the past ten months in the study area, only one cheetah was fitted out with a radio-collar. The cheetah, an adult solitary female, was caught on the farm of Mr. D. Metzger, "Otjisauna-North", and was fitted out with a radio-collar and released on the first of January 1986. This female was followed until the twentieth of June and observations were made on the movement patterns, activities, hunting behaviour and diet.

During the report period, two radio-collared cheetahs died and two more were caught and sent to the cheetah breeding station in South Africa. Of the 17 cheetahs that were radio-collared and followed during the field work phase (two and a half years), by January 1986, only ONE cheetah was left. The radio-collared cheetahs were thus followed for varying time periods, ranging from three months to approximately 23 months. Although this is a very short time period for a project of this nature, enough information was collected to give a BASIC idea of the basic movement patterns and diet of the cheetahs on farmlands, which are the two key questions of this project.

Stock losses on farms were monitored during the past 10 months and the stock records of the concerned farmers were consulted regularly. The farmers were very cooperative in this respect and it was clear that the farmers in this area had been very narrow minded about stock losses in the past. Post mortems were done on 12 cheetahs, caught in and around the study area, all the relevant measures, stomach contents and skeletons were collected and sent to interested researchers in South Africa and America.

Much time was spent in informing and gathering information from farmers, and this year was especially concentrated on farms outside the study area to get more information on other areas. Various farmer committee meetings were attended and information and lectures about the project were given.

A limited but intensive census of cheetah numbers on farmlands was conducted during September. It was decided to use only experienced people in the field and therefore farmers, stock inspectors and nature conservationists from every area were used. With the results of this census, together with the basic information received from the cheetahs over the past two and a half years, it is hoped that an accurate estimation of the cheetahs on farmlands can be given.

Because the data analysis is still in its early stage, this report is only a general summary of the work that has been done thus far. However it is attempted to give a preliminary concept of the general situation of the cheetahs on farmlands. The expected results and especially the planned recommendations for the future management of this population on the farmlands. These recommendations are still in their early stage and are at present being fully researched. It is thus very important at this early stage to receive comments, criticism and suggestions on these recommendations before the final recommendations can be made.

#### STUDY AREA ; METHODS AND TECHNIQUES

Please refer to the Progress report ; October 1984 and October 1985.

## RESULTS

### 1. Movements of the radio-collared cheetahs

Only one female cheetah was fitted with a radio collar during this period. The solitary adult female was caught on the farm "Otjisauna-North" belonging to Mr. D. Mertzger. The cheetah was weighed, measured and fitted with a radio collar before it was released on the first of January 1986. The cheetah was followed on a full-time basis over 24 - and 48 hours periods until the 21 July 1986. During the seven months of following, the female cheetah moved over a total area of 661.26 km. (See Figure 1 A and B).

For the first four months the female moved over a relatively limited area of approximately 250 km<sup>2</sup>, which had a relatively high concentration of game. During the last three months, she suddenly began to move great distances and travelled more than 20 km in one day or night at least four times. In the area where she had temporarily concentrated, there was remarkably less game than at first, also, no other cheetah was seen with her during this time period.

After the field work was finished in August, attempts were made on weekends to try to track this female, but without success. However, farmers in the area had tracked her down twice during September and October. If these two recordings are combined with the previous recordings then it can be said that this female moved over an area of approximately 1 400 km<sup>2</sup> in the past 10 months.

Another interesting observation is that this female was solitary during the seven months of following and during this time she was not once seen with another cheetah. All the other marked females were either with their offspring or within three months they were with their next offspring.

### Movements of the other marked cheetahs:

During this report period, four of the remaining cheetahs had either died or were removed. Two cheetahs were killed by farmers and the other two cheetahs were caught and sent to the

cheetah breeding station in South Africa.

Because the cheetahs were caught, collared and followed at different times during the fieldwork-phase, the tracking periods were vastly different. For example, the shortest tracking period was only three months whereas the longest period was 23 months.

The results that were received during this time-period is thus definitely not a complete idea (or reflection) of the movements of cheetahs on farmlands. The results that were received are thus just the homeranges of the collared cheetahs during the period of tracking.

Despite the short and interrupted tracking period, it was still possible to make a few conclusions on the general movement patterns of cheetahs on farmlands.

#### Adult males:

1. It would seem that only male cheetahs are territorial. Their homeranges ("loopgebiede") have very little overlapping, are very well defined and are apparently defended.
2. It also seems as though males have "concentrated areas" within their homeranges and it is possible that these areas can move from season to season or from year to year.
3. It appears that the homeranges of the males are generally smaller than those of the females, with a size ranging between 650 km<sup>2</sup> and 1 210 km<sup>2</sup> and an average size of 800 km<sup>2</sup>.
4. It is clear that the restricted homerange of one male will extend (or reach) over the homeranges of a number of females.
5. It would appear that the homerange of a male can be quickly occupied by another male if the previous male occupant were to die. However there is not enough data on this aspect for it to be accepted as fact.

#### Adult females:

1. Females definitely do not have territories in its true

sense, which do not overlap with other areas and which are defended. The female's homeranges overlap to a great extent.

2. In contrast with the males, the females appear to use their areas more consistently and have no clear core areas which may change or move from season to season or from year to year.

3. The female's homerange also appears to be larger than that of the male and its size ranges from 1 200 km<sup>2</sup> to 1 700 km<sup>2</sup>, with an average of approximately 1 400 km<sup>2</sup>.

#### Sub-adult cheetahs:

Unfortunately there was only one family of six and a group of three marked, which is not enough to make any definite or clear conclusions.

It would however seem as though young cheetahs which become independent, will move relatively quickly away from their mother to form their own homeranges.

It is very interesting to note that with the one family that was followed, the four males moved as a group and the female moved on her own. The males moved over 120 km before a ....(top of page 9)..... homerange size of approximately 300 km, they moved in a group before they were removed and killed. The female, in direct contrast, moved in a homerange which was very close to that of her mother and after two months she had her own offspring and moved 60 km to finally keep an area of approximately 300 km<sup>2</sup> before she died.

Although there were "wanderings" recorded from the marked cheetahs - a sudden movement in a virtually straight line over a relatively long distance in a short time period, it would appear that this furthest point is part of the cheetahs' homerange, seeing that virtually all cheetahs returned to this point within a few months. Only a longer following period can determine if these "wanderings" are actually part of the homerange.

It is thus possible to be able to distinguish THREE groups of cheetahs according to their movement patterns:

1. The adult males - solitary or in a group, which have clearly defined homeranges and very little overlapping.
2. The adult females - solitary for short time periods or with her offspring, with large areas which overlap to a large degree with each other and also with various males.
3. The sub-adult cheetahs - usually a group of males or solitary females - which travel over large distances to find their own homeranges.

### SOCIAL STRUCTURE AND GROUP SIZES

It was found that cheetah males are either solitary (usually the older males) or in groups of up to five members. As far as can be established, the group consists of family members, usually brothers from the same family, although it would appear that the father will sometimes move with the sons for short period.

The females are either solitary for short time periods - up to seven months - or with their offspring. There were no recorded incidents of more than one adult female in a group nor adult females with adult males.

The males are only with the female for a very short time period (one or two days) during the mating event.

From past observations of farmers and also sometimes in literature, it is found that family groups do sometimes occur: A male, female and their offspring, and also sometimes a group consisting of a few adult males and adult females. It can possibly be ascribed to the fact that young sub-adult cheetahs stay with their mothers for approximately 20 months, and that after 12 months it is very difficult to distinguish between young and adult cheetahs because the young are by that stage almost that same size as the adults.



## REPRODUCTION

The extremely shy character of the cheetah, especially on the farmlands where these animals are intensively hunted, makes the direct observation of the animal - even with the help of radio telemetry equipment - almost impossible. The animal usually moves and sleeps in dense bush, and it is found that if he detects an observer he will immediately move away, often for a long distance before he will get rest.

The recordings of reproduction have thus been pieced together. For example, in the last two years not one female with offspring was found, despite the fact that there has been more than four litters born in the study area during this period. Young cheetahs occur throughout the year in and around the study area, but it appears that there is a peak in December and January.

Litter sizes range from three to nine, with an average of four to five.

The sex - ratio of the litter is impossible to determine due to the fact that there were never any newly born litters found in the field, but from the animals that were caught in trap-cages it would appear that the ratio is 1:1.

The mortality of the young appears to be very low as only two deaths of youngsters were recorded for the entire study period. One two-month old cheetah drowned in a reservoir when the family went to drink, and the other died of a broken hind leg.

Sexual maturity is also very difficult to determine under field conditions, it would appear that the males reach sexual maturity within four to five months of becoming independent and the females two or even three months earlier.

For example, one female gave birth to five young within three months of becoming independent. With a pregnancy of approximately 95 days, she must have become pregnant within one month of becoming independent.

It is clear that there is an very strong family bond between the mother and her offspring. If youngsters are caught in a trap-cage, the whole family, including the mother, are almost always caught within one week, despite the fact

that the adult female is usually very wary of trap-cages. On the two occasions when youngsters in the family died, where the one youngster drowned and where another youngster was shot by the farmer, the mother with her remaining family stayed in the immediate area for up to three weeks and visited the exact spot where the youngster had died several times.

### ACTIVITIES:

It was found that cheetahs are mostly active during the day. In the summer, they are active approximately half an hour to an hour before sunrise to approximately ten o'clock in the morning. Then there is a period of lying in the shade of a dense bush until 16:00h or even 17:00h. Then for a short period of one or two hours, or even half an hour, after sunset they are active again.

In the winter months the cheetah will usually remain inactive until the sun has warmed it nicely - anytime from 08:00 to 10:00 and depending on the heat of the day, will become active until about 12:00/13:00. Then until about 15:00 or 16:00 the cheetah will lie in the shade and then just before or just after sunset, it will become active again.

It was also found that during the period just before, during and after fullmoon, the cheetah is active at night. It appears that especially in the summer the cheetah will move great distances - 10 to 25 km in one night.

It was also found that if the cheetah caught prey, about every three to four days, depending on the prey size, the cheetah will rest/sleep for a day or even two days in the immediate area of the catch before moving further.

## DIET:

The diet of the cheetahs in the study area was observed during the following of the collared cheetahs. The use of spoor (or tracks) were mainly used in the hunting area to determine to a great degree of accuracy, the method of hunting. Carcasses that were found during the following and radio-tracking of the collared animals were thoroughly investigated to determine the cause of death, and in many cases the cause of death was unmistakably due to cheetah predation.

Unfortunately, with this method of determining the diet only the larger and more significant of prey animals could be established, and is thus definitely not a complete picture of the diet of the cheetah, especially because the cheetah is presumed to prey to a large extent on smaller prey species such as hares, mice and even ground birds.

Faecal samples from all cheetahs in the immediate study area were regularly collected. These faecal samples are in the process of being analyzed and they will thus give a more complete picture of the prey species.

If a rough estimate can be made, then it can be said that approximately 70 % of the diet of cheetahs in this study consists of :

Hartebeest, Kudu and gemsbok (in this order)

Calves from birth to six/eight months of age.

Interesting to note is that the cheetah is very wary of gemsbok, and a lone cheetah will very seldom attempt to catch a gemsbok calf, but a group of two or more will almost always attempt to catch it.

It was also found that the gemsbok takes much better care of its calf than say for example the kudu or hartebeest. The later game species run in all directions if a cheetah chases the herd, with the result that the young calves are almost always left behind or are completely separated from the rest of the herd, making them easy prey for cheetah.

Adult and young Springboks, Steenbuck, Duikers and young warthogs are also often preyed on, although the warthog parents are very protective over their young and the cheetah

will usually encounter them as a group.

### HUNTING BEHAVIOUR:

As already mentioned, the hunting behaviour during the catching of prey could only be determined with the help of spoors, and no direct observations were ever made.

It is interesting to note how, to a large extent, the cheetah will almost always choose the shortest possible chasing distance in catching its prey.

In almost all cases all possible coverage (mainly bushes) was used to creep as close as possible to the prey before the chasing phase of the hunt.

In many cases farm fences were used to shorten the chasing distance (and to make the hunt easier) by chasing the animal into the fence and then catching it. In some cases it was even found that the cheetah used a detour to chase the animal into the fence.

It was often found that the cheetah could creep as close as 500m with the coverage of bush before it chased the prey animal. It is interesting to note that in a few cases the cheetah would avoid pan-type areas and would prefer the densely bushed areas for hunting of prey, despite the fact that there were prey animals on the open plains.

From the spoors it can be determined with a relative accuracy, that the cheetah would already be targeted at a specific prey animal in the stalking phase, and would then attempt to get as close as possible to that specific animal before chasing it. Also interesting to note is that although the chasing is done over the shortest possible distance, it is this phase that is especially important in the successful hunting of prey. It appears that it is a requirement for the prey animal to run before the cheetah catches it. For example, it was found in two cases of a herd of gemsbok, and in one case of warthogs, that the herd of animals stopped short and then confronted the cheetah (or cheetahs). In both cases the cheetahs stopped

short and turned, and by pawing the ground, tried to storm over short distances of less than five to ten meters, but eventually they turned around and moved away.

With the aid of spoors, it was observed that the same happened when two cheetahs chased a warthog and her three young. The three young warthogs fell into a hole after being chased a distance of about 60m, and their mother guarded over the hole. The cheetahs stopped short 20m from the mother and again pawed the ground and attempted short storms before eventually moving away without any success.

There is not one recorded case where a cheetah has preyed on a newly born calf, and it has been noted by several farmers that if a calf lies still the cheetah will leave it alone.

In cases where more than one cheetah hunts in a group - and the animals are old enough to hunt (from 15-18 months) - it is clear that there is a definite hunting pattern which can already be seen in the stalking phase.

The cheetahs will stalk in a parallel line or sometimes even in a half-moon shape.

If the prey is stormed upon, it is also done in a parallel line, and it would appear that this is maintained until the prey is caught.

If two animals are involved in the hunt, the one will run to the inside and the other will run to the outside of the prey animal. The cheetah on the inside will usually grab the prey by the neck while the cheetah on the outside will chase and keep the mother away.

The cheetah claws the prey with the aid of the sharp nail on its forepaw and will then bite on the underside of the neck, or it will pounce on the prey. The younger and smaller prey are especially pounced on at the neck - the prey falls over - and is bitten on the underside of the neck.

It appears that the cheetah chokes or throttles the prey rather than biting it to death in say for example the leopard. It also appears that it is done by holding onto the throat until the animal is dead. In almost all cases, the animal is then dragged a short distance of 20 - 80m to the

nearest bush or bit of shade where the prey can then be consumed.

The cheetah will begin to consume the soft flesh of, usually, the inner hind leg.

The abdominal cavity is usually torn open, but the stomach contents and intestines are almost never eaten. The top end of the rib-cage is almost always opened and the heart is eaten. If only one cheetah is present, only the preferred meat is eaten and the rest of the carcass is left as is. More than one cheetah will naturally eat more of the meat, but the intestines, the head, big bones and skin are not consumed.

It appears that the cheetah will generally not return to its prey as a rule, unless it was disturbed away from its prey before it had finished eating. Or if a female with offspring caught the prey and in this case the female will go to fetch her young before returning to feed on the carcass.

However it has been found that a female with very young offspring, and one old and thin female cheetah (in both cases caught in a trap shortly afterwards) scavenged from old carcasses.

In general it is found that solitary cheetahs will catch prey every three to four days. There have been recorded cases where cheetahs have gone without catching anything for up to seven days. Groups of cheetahs, especially a mother with young, will usually catch prey every second or third day.

## STOCK LOSSES:

Stock losses were continually monitored on the farms in the study area. As soon a stock loss was detected by a farmer, all possible measures were taken (in most cases) to find the carcass of that animal, and then with the help of spoors, feeding methods and other methods, the cause of death was determined.

However, because of the relatively short duration of the this project, during which as much possible information was gathered and where the maximum number of animals were collared and followed, there was not always enough time to give the necessary amount of attention this aspect required. A get a complete picture of stock losses, it is necessary to do a separate full-time study on this aspect. The time that was available and that was devoted to this aspect uncovered very important and insightful results.

It was again found, as in the past two years, that the cheetah is actually responsible for a very small percentage of the stock losses on farmlands.

With the cattle it was again found that the average calf loss per year due to cheetah predation was on average THREE to FOUR calves per year.

It is very interesting that almost without exception, all the farmers that were involved in this project, lost remarkably less calves in the past two years than before.

Almost all the farmers have admitted that it is due to the fact that they now fully investigate the cause of death of a calf before they record it as lost due to cheetah predation. In the past, almost all missing calves were recorded as lost due to cheetah predation simply because there was at that time, or just before then, cheetah spoors found on the farm and " it was naturally caught by a cheetah - what else could it have been?"

Also interesting to note is that most of the calves that were caught were caught in the time period when there was little or no game-calves, while at other times only game-calves were

caught.

As far as can be established, with the few radio-collared cheetahs, it would appear that cheetahs prefer natural prey animals to domestic animals, and it was found in many cases that cheetahs would move through camps where there were young calves - available prey - and move to bordering camps or even farms where they could catch game.

However it is also found that like with other predators, the cheetah can become a problem animal which specialises in catching cattle calves. For example it was found that with two cheetah males that were caught and released five times, that they would only catch cattle calves. Also one old female cheetah, which had broken teeth and was blind in one eye, only caught goat kids.

In contrast with the relatively few cattle calves that are caught, sheep and goats were caught more often and in greater numbers. (especially by females with young that needed to catch prey more often). These domestic animals are naturally much easier and quicker to catch.

#### NON-COLLARED CHEETAHS TRACKED, CAUGHT AND KILLED:

In this report period, 12 cheetahs were caught in the study area and killed. All the animals were weighed, measurements taken, organ samples, blood samples, stomach contents and skeletons were collected from each.

After the completion of the project, a further 7 cheetahs were caught by farmers in the study area.

During this time period all recordings of other non-collared cheetahs in and around the study area were noted from personal as well as farmer's and farm-worker's observations.

In these 12 months, a total of 26 cheetahs were recorded in the study area. It is of course impossible to accurately estimate how many of these recordings are repeated recordings of the same cheetahs, but it is determined that about 16 different cheetah were recorded in this time period. It is also thought that about 80 % of these cheetahs were actually



Just passing through the area in search of their own homeranges.

DENSITY OF CHEETAHS IN THE STUDY AREA:

To determine the density of cheetahs in the study area, all the permanent cheetahs in the area must be known and counted. Because only one cheetah was collared in the past seven months, no calculations can be made for the density of cheetahs in this time period.

Until and including December there were about 18 cheetahs on one hundred thousand hectares, which is a density of one cheetah to 55.5km (5 500 hectares).

If the total number of cheetahs must be calculated, the permanent and "passing-through" cheetahs included, then there is a total of 34 cheetahs on 100 000 hectares and a density of 1:29km.

## DISCUSSION

It must be emphasised that this study of cheetahs on farmlands cannot be described as a complete, detailed or conclusive project, but rather as a basic grounding which has briefly investigated the general tendencies of cheetah movements, behaviour and diet on farmlands.

As already mentioned, the basic and limited results that were received does however give a relatively clear picture of what is happening with cheetah on the farmlands and what the present situation is.

### 1. The first key question of this project:

"What is the population size and tendency of the cheetahs on the farmlands ?"

It must be realised that it is almost impossible to ever get an accurate estimate of predators on farmlands, especially with the shy cheetah.

If the basic information about this predator - especially its movements and density - is known then it may be possible to calculate a reasonably accurate estimate.

As mentioned, a cheetah census is presently being launched and it is planned to use the basic information on the cheetah's movements and density to get the most accurate estimate of numbers on farmlands as possible.

All previous estimates of cheetah numbers were mostly done through questionnaires and personal communication with farmers and other knowledgeable people, without any knowledge of cheetah movements. Therefore it can be expected that these estimates are apparently far from the real situation.

All information on the present census has not yet being received, but it is still possible at this early stage to say that the expected numbers are remarkably LESS than the present "official" number of "over 6 000". It appears that this number is more in the region of 2 000 to 3 000 for all the farm areas !!

### 2. The tendency of the population:

Where the numbers of cheetahs is almost impossible to

determine, the tendency is even more difficult, and instinct and guess work is almost always used to attempt to answer this important question.

Farmers and other "experts" are of the opinion that the population has INCREASED over the last few years. The apparent reasons for this opinion can be due to the fact that farmers now catch cheetahs on farms where the animals had never occurred before; farmers now catch more cheetahs than in the past; and that there are now more stock losses due to cheetah predation.

During the past two and a half years in the field, various farmers in and around the study area have been spoken to, and the written records of a few farmers for the past five years where cheetahs were responsible for stock losses and were caught were checked.

From these records and discussions it would appear that there was an INCREASE in the cheetah population from about 1979 - 1982 - judging by the fact that more cheetahs were caught in this time period and that there were more stock losses. Since 1982, 1983 there has been an apparent DECREASE in the number of catches and stock losses.

It can possibly be argued that the great "over population" of kudu ( one of the main food sources for cheetah) resulted in an INCREASE in the cheetah population. With almost all other predators it has already been established that predators react very quickly to an increase/decrease in the available food. The resultant big outbreak of rabies in kudu resulted in a great reduction of this population, which meant that the foodsource of the cheetah was also drastically reduced. A possible result of this reduction of foodsource could be that the cheetahs were forced to spread out in search of food, and that there was naturally another available food source - stock animals - which could be utilised to a greater degree than previously.

It must be realised that this is a nice but oversimplified explanation of an incredibly complicated system, and that other factors definitely also played a role in this.

At the moment these are the only known facts, and until it can be ascribed to other factors, it is the only apparent explanation for what has occurred here.

With this "big" cheetah population, which had to compete for a reduced food source, and which caught more stock animals, the cheetah suddenly became known as the greatest problem animal in the Northern districts.

Johan Lensing, the previous problem animal official of this directorate, in 1980 did a country wide survey of problem animals and according to priorities planned a research programme for the future.

It is thus enlightening that the cheetah is NOT mentioned on this otherwise complete list of problem animals.

With the sudden appearance of the cheetah as the biggest problem animal in the North, farmers caught and destroyed cheetahs in unbelievably high numbers.

For example, three farmers in the study area, less than 10 km away from each other, in the time period 1980 - 1982, caught and either removed or destroyed 83, 64 and 56 cheetahs!!! An increase can also be seen from the permit records for possession of skins for the time period. (See table \*)

From about 1981/'82 the media regularly reported (put forward) the highly threatened international status of the cheetah. The international ban on the trade of the cheetah had a visible effect in S.West during this timeperiod and the game farmers could no longer receive cheetah from farmers. This publicity which was given to the cheetahs, the ban on the trade of the animal, and the inability of our own directorate to receive cheetah from farmers (no suitable movement area) led to a negative attitude of the farmers towards the conservation organisations and especially the cheetah. All the more farmers regarded the cheetah simply as a pest on farms, and that the fastest it can be got rid of the better. Because the farmer had no market for the live animal, and the cost of treating the skin is more than they could get back for it, it led to farmers no longer requesting permits to shoot cheetahs. This tendency was observed by almost all farmers in the two and a half years of working in the field, over just

about the whole distribution area of the cheetah. Farmers now simply shoot the cheetah (s) and either bury them or leave them in the veld for the scavengers.

This tendency was also found in the study area where in the past two years 37 cheetah died, but according to the permit records for this time period, only 19 cheetahs were killed. This negative attitude of farmers towards the cheetah leads to farmers wanting to catch and shoot all cheetahs on their farms - whether he has stock losses or not.

It would appear that this large scale destruction of cheetahs - for at least the past two years - over the entire cheetah distribution area - has a NEGATIVE effect on the population and that it is in the process of slowly decreasing.

### 3. The third key question:

"What are the actual stock losses caused by cheetahs?"

The actual stock losses which are caused by predators should be the basis of any predator study or management programme. This is the one aspect which has thus far never been investigated properly. With the results of the past two years in the field it is clear that this aspect is of extreme importance and - as already mentioned - it should be done as a separate full-time study.

From this study it was found that the AVERAGE loss of cattle due to cheetah predation is THREE to FOUR calves per farm per year.

The financial loss of about R2 000 (potential cost) may sound high, but it is important to look at it in perspective with other losses that occur.

Unfortunately only one farmer in the study area had complete and accurate records of all stock losses to date, and according to this had recorded a total loss of calves as 11% to 14%. Of these losses, only 1.8 to 3% were due to cheetah predation.

It is very remarkable and distressing how few farmers keep good records of their cattle and how few farmers actually know what is happening with stock losses in the veld.

In many cases cattle are only counted every one, two or even three months, and calves that are missing are simply said to

be lost due to cheetah predation.

The few farmers which actually did keep good written records of all calf births and mortalities, had almost always much less losses that were as a result of cheetah predation.

It is also astounding to see how few farmers actually take steps to limit or prevent stock losses to predation. The few farmers which actually do go out in the veld or who send workers out daily to watch over young calves generally have a much higher survival rate of calves.

Although these flaws of the farmer's management can be repeatedly shown, the emotional factor in the practice is difficult to be rid of. The loss of one calf which is caught by a cheetah will always remain equal to the loss of three or four due to natural causes.

Besides the urgent need for correct information and advice for farmers on the habits of the cheetah and the causes of stock losses, other solutions will certainly be needed if there is to be a core population of cheetahs on farmlands in the future.

#### RECOMMENDATIONS FOR THE CONSERVATION OF CHEETAHS ON FARMLANDS

##### 1. The increase of economic value

It is already very clear, in many other places and especially in this country that for any successful conservation programme on private land, there must be an economic value of game for farmers. If the farmer receives a limited income from cheetahs which are caught on his farm, his attitude towards the cheetah will change so much that he will actually encourage a core population of cheetahs on his farm.

It is suggested that this can be achieved by the sale of live animals and by trophy hunting.

There remains a demand for cheetahs from breeding stations, zoos, private game farms, etc. from almost all over the world. If a yearly quota can be established with a minimum amount payable to the farmers from game traders - there can be a significant income available for farmers.

Trophy hunting is today one of the biggest tourist attractions of this country, and almost all professional hunters and

owners are keen to be able to offer the trophy hunting of cheetahs. Because this trophy is apparently much sought after and because S. west will be the only country which will legally permit the hunting of this animal, it will be a big attraction for many rich trophy hunters.

Again on a quota system, and where any farmer may permit a cheetah to be hunted on his farm by a trophy hunter, it will mean that farmers can receive a limited income per year.

## 2. Cheetah reservoir areas

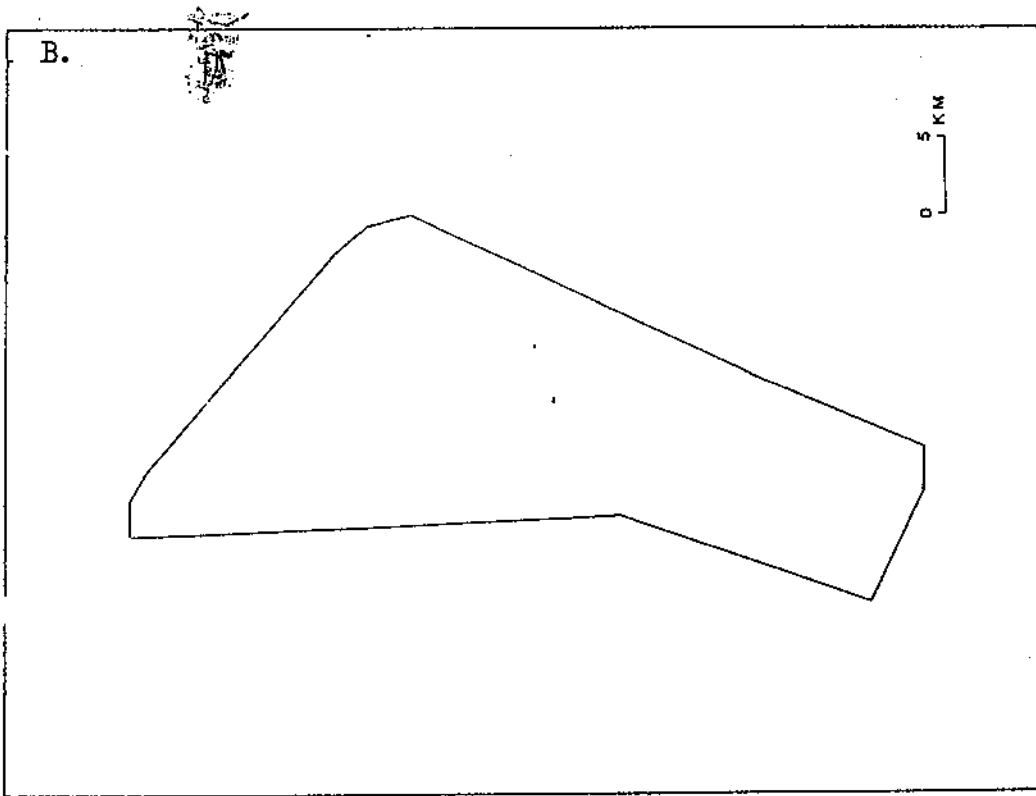
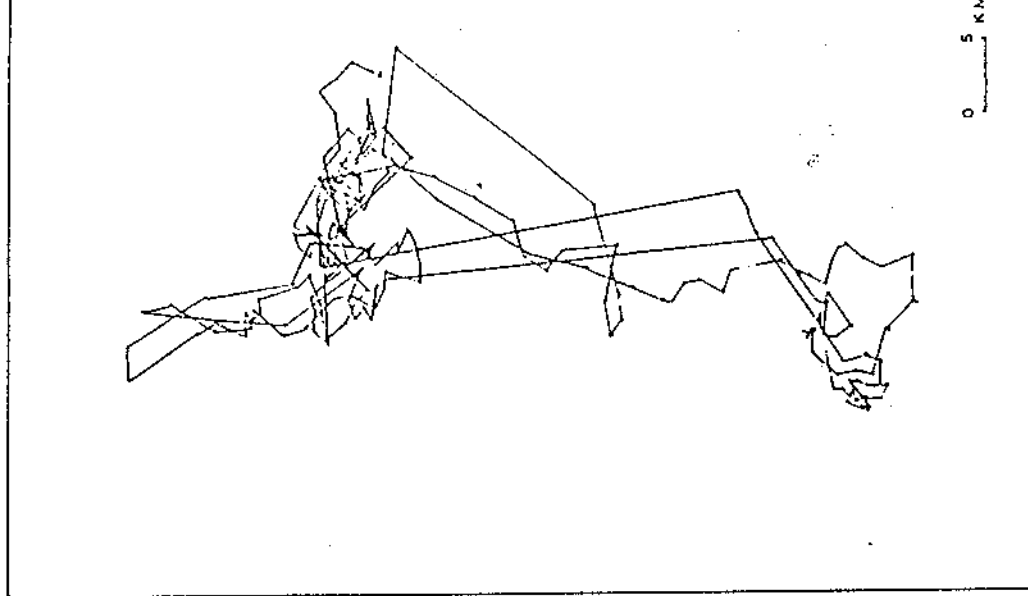
It is clear that the sale of live cheetahs or trophies will cover only a small amount of the farms and that it will need the cooperation of other "conservation-plans".

It is suggested that a number of areas throughout the distribution area be chosen as reservoir areas responsible for the breeding of a limited population. In these areas which must include a number of farms, the farmers must agree that a calf loss of 3 to 4 calves a year is acceptable - and that only problem animals will be killed. These farmers will then receive some sort of subsidy which may be received in various forms.

These ideas are accepted increasingly on private land overseas and recently also in the Republic, and it is a possibility which has much potential and must be investigated at depth.

3. Lastly, it is recommended that an intensive, full-time study is launched to make an accurate conclusion of the stock losses. This study must stretch over and include as many areas as possible. Only with such accurate information, and including the already known facts can an intensive information and training programme be given to all farmers.

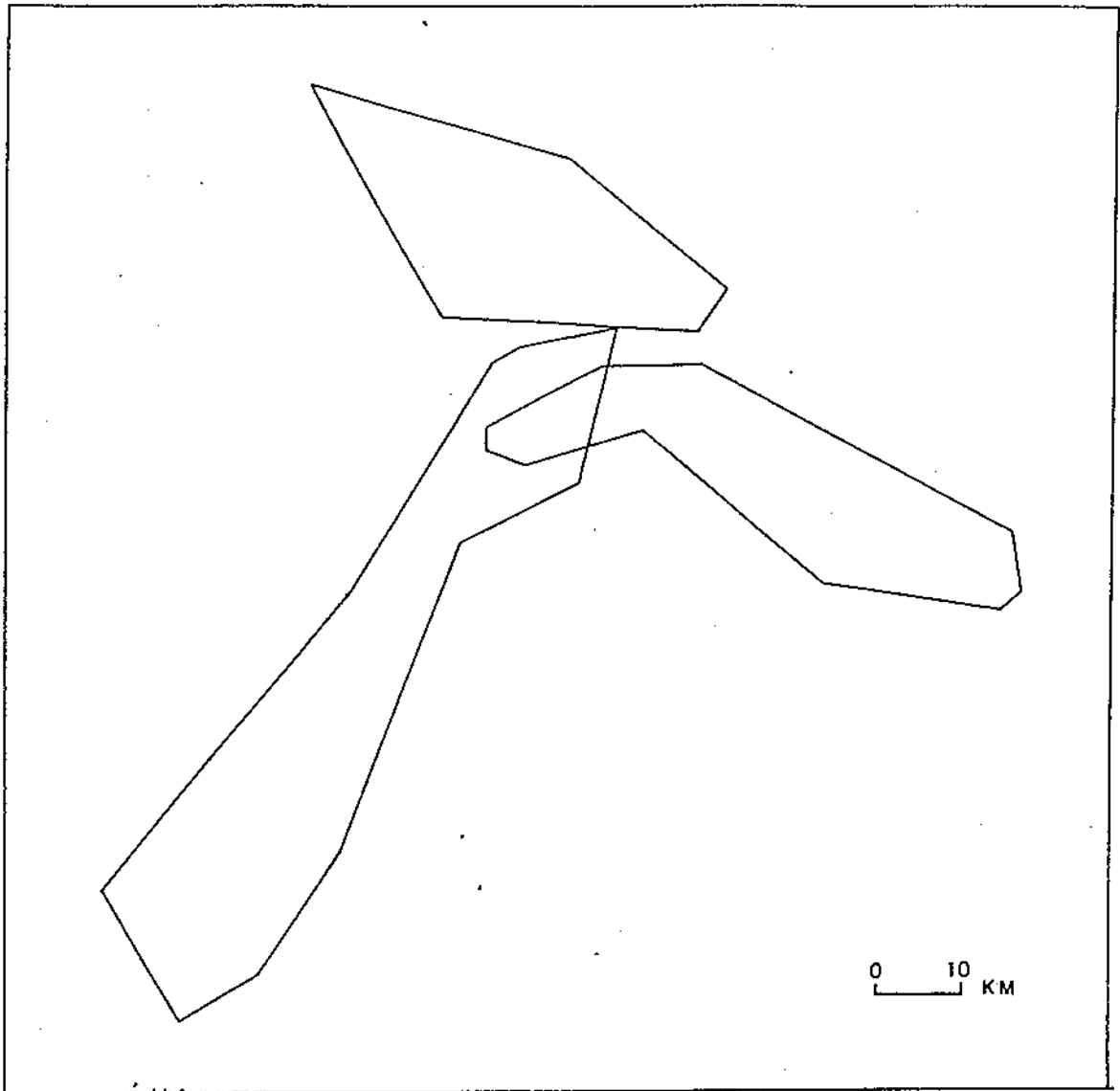
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FIGUUR 1. :DIE GEDETAILEERDE (A) en TOTALE BEWEGINGSAREA (B) VAN DIE  
LAASTE RADIOGEMERKTE WYFIE - 1/1/86 - 20/7/86.

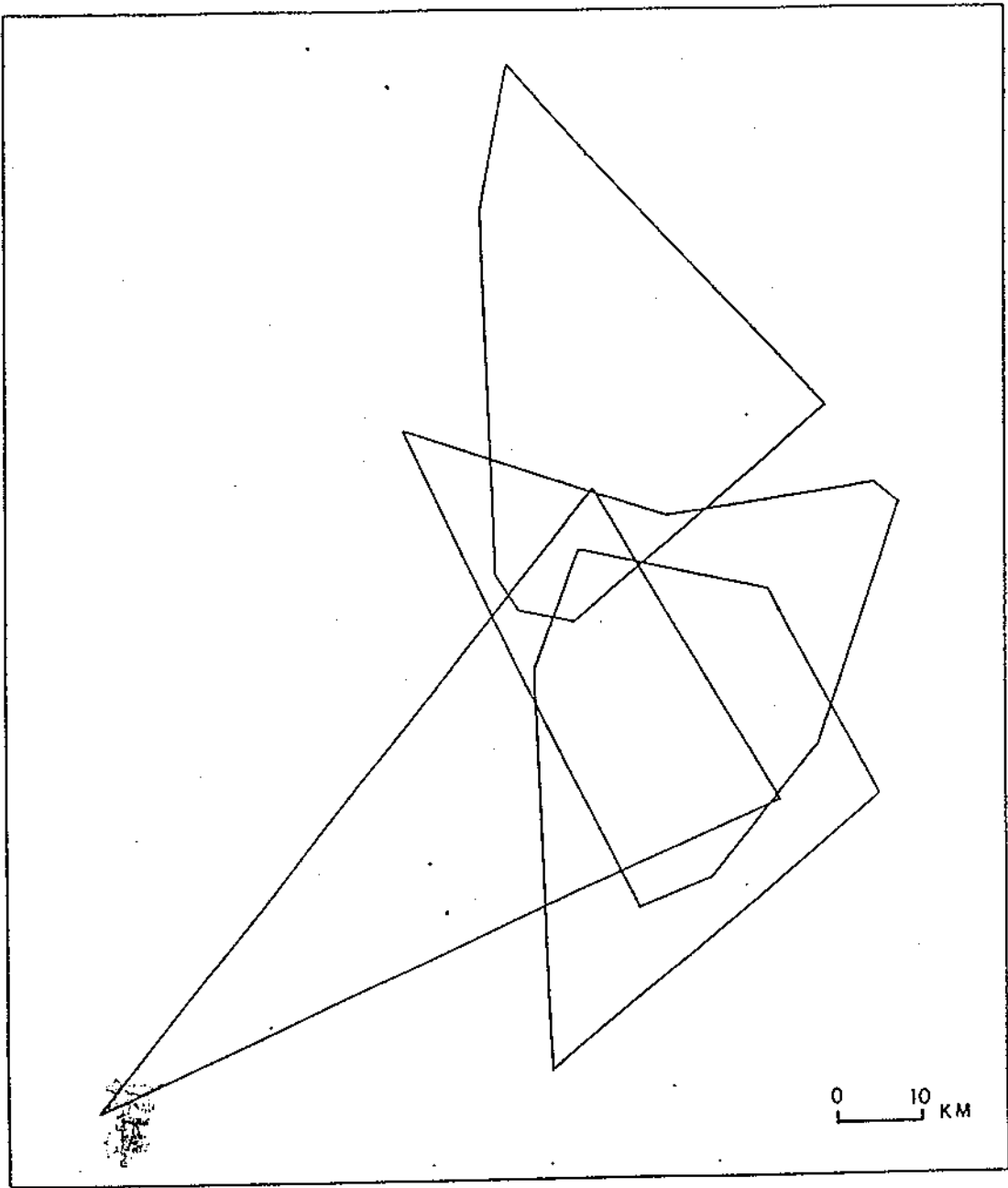
THE DETAILED (A) and TOTAL MOVEMENT AREA (B) OF THE  
LAST RADIO-COLLARED FEMALE - 1/1/86 to 20/7/86.





FIGUUR 2 : DIE BEWEGINGS-AREAS VAN AL DRIE VOLWASSE RADIOGEMERKTE  
JAGLUIPERD MANNETJIES VIR DIE TYDPERK FEBRUARIE 1984 -  
NOVEMBER 1985.

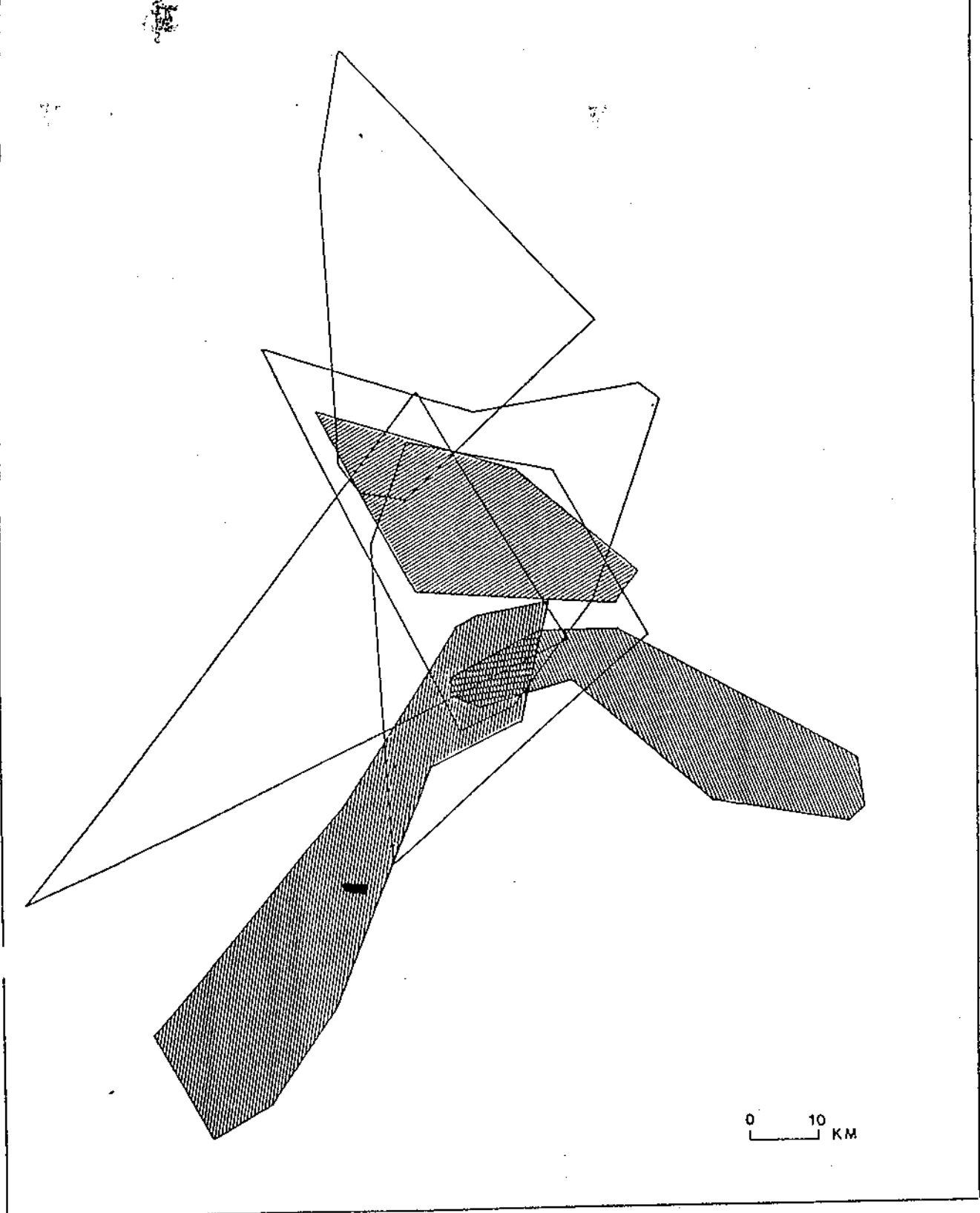
THE MOVEMENT AREAS OF ALL 3 ADULT RADIO-  
 COLLARED CHEETAH MALES FOR THE PERIOD  
 FEB 1984 - NOV 1985



FIGUUR 3 : DIE BEWEGINGS-AREAS VAN AL VIER RADIOGEMERKTE JAGLUIPERD  
WYFIES VIR DIE TYDPERK FEBRUARIE 1984 - NOVEMBER 1985.  
 THE MOVEMENT AREAS OF ALL 4 RADIO-COLLARED  
 CHEETAH FEMALES FOR THE PERIOD FEB 1984 - NOV 1985

TABEL: | DIE TUISAREA- GROOTTES VAN DIE 17 RADIOGEMRKE TE JAGLUIPERDS  
 THE HOME AREA SIZES OF THE 17 RADIO COLLARED  
 CHEETAH

JAGLUIPERD (CHEETAH)	TRACKING PERIOD (MONTHS) AGTERVOLGINGS- TYDPERK (MAANDE)	HOME AREA SIZE TUISAREA- GROOTTE (KM <sup>2</sup> )
<u>ADULT</u> VOLWASSE ♀:		
ONE ♀ EEN ♀	23	I 323.53
ONE ♀ EEN ♀	5	I 713.45
ONE ♀: EEN ♀:		
Eerste werpsel First litter	10	I 235.53
Tweede werpsel Second litter	6	422.36
TOTAAL	16	I 657.89
EEN ♀ ONE Met laaste waarnemings van boere <i>With last observation from farms</i>	7	661.26 I 392.27
<u>VOLWASSE ♂: ADULT</u>		
ONE ♂ EEN ♂	21	I 210.08
EEN ♂ ONE	9	652.94
TWEE ♂♂ TWO	13	651.26
<u>SEMI-ADULT</u> SEMIVOLWASSE:		
THREE ♂♂♂ DRIE ♂♂♂	3	390.76
THREE ♂♂♂ DRIE ♂♂♂	13	321.05
ONE ♂ EEN ♂	6	276.31
ONE ♀ EEN ♀	15	I 596.05



FIGUUR 4 : DIE BEWEGINGS-AREAS VAN AL DIE VOLWASSE RADIOGEMERKTE  
JAGLUIPERDS - MANNETJIES (GEKLEURD) EN WYFIES VIR DIE  
TYDPERK FEBRUARIE 1984 - NOVEMBER 1985.

THE MOVEMENT AREAS OF ALL THE ADULT RADIO-COLLAR  
 CHEETAHS - MALES (COLOURED IN) AND FEMALES FOR  
 PERIOD FEB 1984 - NOV 1985

TABEL: 2 DIE GEMIDDELDE TUISAREA-GROOTTES VAN DIE GEMERKTE JAGLUIPERDS  
THE AVERAGE HOME-AREA SIZES OF THE COLLARED  
CHEETAHS

VOLWASSE MANNETJIES ADULT MALES	838.09 km <sup>2</sup>
VOLWASSE WYFIES ADULT FEMALES	1 521.79 km <sup>2</sup>
SEMI-VOLWASSE MANNETJIES SEMI ADULT MALES	329.37 km <sup>2</sup>
SEMI-VOLWASSE WYFIE SEMI-ADULT FEMALE	1 596.05 km <sup>2</sup>



TABEL: 3    VEE-VERLIESE OP PLASE IN DIE STUDIE AREA VIR DIE TYDPERK:

NOVEMBER 1985 - OKTOBER 1986    STOCK LOSSES ON FARMS  
 THE STUDY AREA FOR THE  
 PERIOD NOV 1985 - OCT 1986

PLAAS:    FARM	LOSS OF CATTLE CALVES VERLIES AAN BEESKALWERS  %	LOSS OF GOATS VERLIES AAN BOERBOKKE  %
Otjisauna- Zwerveling	3.25	-
Otjikundua Geduld	0	-
Vreemdeling	1.5	-
Uitkyk	7.8	16.4
Vooruitgang Okaharui	1.7	15.3
Eleksie	6.15	12.4
Schweizerland	2.8	7.2
Eensgesind Montheith	1.9	5.3
Ombakatjiwinde	2.3	-

	BORN GEBORE	CAUGHT GEVANG	%
TOTALE AANTAL KALWERS TOTAL CALVES	1246	26	2.09
TOTALE AANTAL BOERBOKKE TOTAL GOATS	641	52	8.11

Table 4 : Departemental permit rekords for Cheetah 1980 - 1986 (-2I/8/86)

Type of Permit	'80	'81	'82	'83	'84	'85	'86
<u>Live Export :</u>							
TO Overseas	84	41	30	98	37	85	36
TO R.S.A.	55	17	10	26	24	28	22
<u>Possesion of Skin</u>	623	669	850	721	646	537	203
<u>Trophy Hunting</u>	0	0	0	12	8	21	10
TOTAL	762	727	890	857	715	650	271

TABLE 2 : Trophy Hunting :

TYPE	'83	'84	'85	'86
Apply	66	49	115	109
Shot	12	8	21	10
Exported	10	6	11	?