Intensity distribution patterns for five species of problem animals in South West Africa

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by
J. E. Lensing
and
Eugéne Joubert

Nature Conservation and Tourism Division,
South West Africa Administration.

CONTENTS

ABSTRACT

A questionnaire survey on the status and distribution of mammals in South West Africa conducted by the Nature Conservation and Tourism Division formed the basis for research into the intensity of loss or damage caused by the five proclaimed problem animal species in the Territory. In the questionnaire survey farmers were requested to state whether or not they were experiencing problems with any of the five species. The raw data in the form of "yes" or "no" answers were converted to frequency of problem per unit area and expressed as percentage problem intensity. These values were plotted on a series of maps which graphically illustrate the seriousness of the problem caused by each species. The intensity patterns obtained in this manner are explained in terms of topography, climate and farming practises.

1 INTRODUCTION

South West Africa's wildlife legislation makes provision for the proclamation of certain species of indigenous mammals as "problem animals".

A problem animal is an indigenous mammal which causes an economic problem to the agricultural sector or a health problem to the community as a whole due to its activities or numbers. A proclaimed problem animal may be hunted by landowners or occupiers at any time in any number by any method approved by the Nature Conservation and Tourism Division and problem animals, therefore, are accorded the lowest status of all mammals in South West Africa.

The following species have been proclaimed problem animals:

Black-backed jackal (*Canis mesomelas* Schreber)
Cape hunting dog (*Lycaon pictus* Temminck)
Caracal (lynx) (*Felis caracal* Schreber)
Baboon (*Papio ursinus* Kerr)
Rock hyrax (*Procavia capensis* Pallas)

The black-backed jackal is a problem to sheep farmers throughout the Republic of South Africa and South West Africa, being responsible for heavy losses to sheep flocks in the more arid extensive sheep-farming regions. The problem has a long and stormy history, not recounted here, and continues to exist in the Karakul sheep-farming region of South West Africa which constitutes roughly the southern half of the Territory. Besides stock losses caused by black-backed jackal this species is also one of the most important hosts of rabies, so that it is regarded by many farmers in the cattle-farming region as a serious health hazard and is therefore, often shot on sight.

The Cape hunting dog is the cause of losses to cattle herds in the north-eastern part of the Territory. Man has always been prejudiced against this species because of the manner in which the wild dog pack runs its prey to a standstill and then proceeds to devour it while still alive. Unfortunately the Cape hunting dog is now threatened with extinction, a fact which makes the problem even more complicated.

Caracal or lynx are responsible for losses to sheep and goat flocks, but to a lesser extent than black-backed jackals. However, farmers experience considerably more difficulty in controlling caracal than black-backed jackal so that, where caracal problems occur, damage can be considerable before the animals concerned are destroyed.

Baboons are at times a severe problem to sheep and cattle farmers in the mountainous regions of the Territory. In the

more arid sheep-farming regions the natural food supply of this species dwindles during the latter part of the dry season and certain individual baboons become predatory, taking lambs from sheep flocks. Baboons also damage drinking troughs, reservoir valves, pipelines and water pumping installations and may damage fences, gates, farm buildings and all manner of farm installations.

The rock hyrax or dassie is South West Africa's most recent problem animal. This species appears to have increased tremendously during the past 10 to 15 years, presumably as a result of the almost total extermination of predators such as black-backed jackal and lynx from sheep farms on which jackal-proof fencing was erected during the early 1960's. Jackal-proof fencing restricted movement of predators and enabled farmers to almost completely exterminate them. In the mountainous parts of the sheep-farming regions the hyrax population increased so that most of the available hyrax habitat became occupied. During dry years the hyrax competes with sheep flocks for grazing and browse and damages the veld.

The Nature Conservation and Tourism Division conducted a postal questionnaire survey in 1973 to determine the status and distribution of mammals in South West Africa. (Joubert and Mostert, 1975). From the questionnaires returned by farmers, data for those parts of the territory divided into farms were gained. Estimates of mammal populations for the remaining parts (game reserves, Bantu territories and diamond areas) were made from aerial surveys and personal observations. Besides asking farmers to estimate the numbers of the various mammals on their farms, the questionnaire also asked farmers to indicate whether any of the five proclaimed problem animal species were causing problems. This paper uses these data to determine the intensity of problems caused by problem species.

The loss to agricultural production caused by problem animals in South West Africa has resulted in public demand for research into the ecology and control of problem animals. However, due to the fragile nature of ecosystems in arid regions, problem animal populations require scientifically oriented management and control. This requires that management and research priorities have to be determined. It is hoped that the present paper will help to indicate some of these priorities. At present the rock hyrax is the subject of an extensive ecological research project.

2 METHODS

The present research was conducted to determine the distribution and intensity of the problems (loss or damage) caused by problem animals, not the distribution of these animals. Data from farmers are based on frequency per unit area. Hence the present survey covers only those parts of South West Africa which have been divided into farms. The following areas were thus excluded:

All game reserves and national parks.
All municipal land.
All tribal areas, both Bantu territories and Bantu Trust Land including:
- Kaokoland
- Owambo
- Kavango
- Bushmanland
- Hereroland
- Damaraland
- Rehoboth Gebiet
- Namaland
- Aminius Reserve and the adjacent corridor
- All other Bantu Trust Land

State land such as agricultural research farms, land surrounding State water impoundments
Swakopmund district (no farms)
Diamond Area 1
Diamond Area 2
Walvis Bay Territory (no farms)

It was not possible to indicate all of these areas on the maps included as some of them are fairly small.

2.1 Land units

Joubert and Mostert (1975) obtained the addresses of all *bona fide* farmers from the Department of Inland Revenue and mailed questionnaires to them. The land unit basis of their survey was therefore, the unit of land registered at the Deeds Office and owned or occupied by a *bona fide* farmer. They found that there were 5 388 farmers and received 2 886 returned questionnaires. As many farmers owned or farmed more than one farm, the 2 886 returns represented 3 284 farms.

The unit of land in the present survey can be termed an "undivided farm" and is represented by a farm name and number on the 1 : 1 000 000 scale map of South West Africa. Farms indicated in this manner on the map are the units of land surveyed when the land was originally made available for farming purposes. The 1 : 1 000 000 scale map does not indicate consistently how undivided farms have been subdivided nor does it give the names of these subdivisions. An "undivided farm" may be owned or occupied by several farmers.

Although the total number of *bona fide* farmers and even the number for each district were known, there was no way of determining the number of *bona fide* farmers per quarter degree square, which was the unit of area used in the conversion of raw data to frequency. The number of undivided farms per quarter degree square was known. We found a total of 4 891 undivided farms in South West Africa.

2.2 Conversion of raw data

The number of undivided farms in each quarter degree square was counted. Where a farm was situated on the border of a quarter degree square, the farm was included in the square which contained most of its area. Each farm that reported problems with one of the problem animal species was marked with the aid of a coloured map pin, a different colour for each of the five species. As more than one questionnaire per undivided farm were sometimes encountered, a farm was marked only once for each species. Farms reporting no problems were left unmarked.

It was assumed that the ratio farms : undivided farms was the same among answered questionnaires as among unanswered questionnaires. Therefore, the total number of undivided farms per quarter degree square was reduced by the reciprocal of the percentage return for each district calculated by Joubert and Mostert (1975).

The number of pins for each species in each quarter degree square was divided by the reduced total number of undivided farms and expressed as "percentage problem intensity." The basis of this calculation was that the greater the number of farms reporting problems per unit area, the greater the intensity of the problem.

2.3 Presentation of data

The set of values thus obtained for each species was divided into five class intervals. (See figures 1 to 5). The quarter degree squares on a small scale map were shaded in 5 different intervals, providing a graphic representation of problem intensity. Each of the five species is represented on a separate map.

3 RESULTS

Results are presented in maps 1 to 5. For the sake of completeness, and because it may be necessary to compare intensity values within one class interval, the complete set of intensity values for each species is presented in table 1.

3.1 Possible causes of inaccuracy

There are a number of possible causes of inaccuracy, some of which are enumerated below with their possible effects and measures taken to counteract these effects, where such measures have been possible.

3.1.1 Edge effect

Some of the quarter degree squares are situated on the borders between farmland and land excluded from the survey. In these fragments of quarter degree squares the total number of farms was often low, reducing the sample size to unacceptable levels and making the frequency determinations suspect. To counteract this, the procedure adopted was that if farmland covered more than one half of the area of the square, the square was considered whole. If farmland constituted less than half of the square, it was then added to the adjacent square with the longest communal border. If these two squares then constituted a farmland area of more than one half of a square they were then considered a whole. If not, they were added to the next adjacent whole square.

3.1.2 Sample size within the quarter degree square

The sizes of farms in South West Africa vary considerably and one finds enormous farms in the far south of the Territory. This reduced the sample size in some of the southernmost squares considerably, and some of the intensity patterns on the southern border of the Territory are suspect.

3.1.3 Distribution of returned questionnaires

The distribution of returned questionnaires plays an important part. It appeared that farmers either returned or did not return the questionnaire in groups. For example, if one farmer returned the questionnaire, his neighbours did as well or vice versa. Joubert and Mostert (1975) presented a map showing the actual distribution of returned questionnaires, which indicated the areas from which no information was forthcoming. This phenomenon was possibly counteracted by the use of quarter degree squares to convert the raw data into frequencies and by applying percentage return values to the total number of undivided farms.

3.1.4 The application of percentage return values

The application of percentage return values for each district to the total number of undivided farms in each quarter degree square could have been the cause of inaccuracy. Firstly, some quarter degree squares overlapped the borders between districts, in which case the value for the district in which the largest part of the square occurred was applied to the square as a whole. Secondly, the percentage return value obviously varied within the districts so that in some quarter squares the total number of farms was reduced to a number lower than was actually the case. This had the effect that some of the percentage problem intensities had values of well over 100 %. Similarly, in other squares the total number of farms in the square was reduced by the application of percentage return to a number higher than the number actually having returned information from the square. Percentage problem intensities were accordingly reduced, but there was no way of becoming aware of this, neither was it possible to counteract the phenomenon.

3.1.5 The ratio of farms: "undivided farms"

The possible inaccuracies caused by this ratio were counteracted by only marking an undivided farm once for each species thereby reducing the number of farms represented by returned questionnaires for each quarter degree square to the number of undivided farms represented by the returned questionnaires.

3.1.6 Farm sizes

South West Africa has several farms in excess of 50 000 ha. These over-large farms occur mainly in the southern half of the Territory and had the effect of reducing the sample size of the quarter degree squares in which they occurred. It was not possible to counteract this phenomenon.

4 DISCUSSION

The value of information obtained from a questionnaire survey is often debatable, due to farmers over- or underestimating numbers of animals. In this case it is felt that the results should be accepted at face value, whilst it is stressed that the work is a survey of farmer's opinion and is, in fact, based on "yes" or "no" answers. The farmer's opinion of whether or not he had a problem with one or another of the five problem animal species was not subjected to further arbitration and was accepted, no matter how slight the problem appeared to be.

4.1 Economic problems

4.1.1 Black-backed jackal, *Canis mesomelas* Schreber

By comparing the percentage intensity values for black-backed jackal with the other four species for the whole of South West Africa, it becomes clear that the black-backed jackal remains the Territory's major problem animal species. In Map 1 it will be seen that the highest intensity of black-backed jackal problems occurs mostly in the sheep and goat farming regions and is found mainly in the southern half of the Territory. The districts most afflicted are Mariental, Maltahöhe, Bethanien and Lüderitz. It is also clear that the highest intensity (76 – 100 %) zones on the southern border are found either in the Diamond Areas or the Rehoboth Gebiet and Namaland, all three areas providing a reservoir of animals which overflows into the adjacent farmland, thereby increasing the intensity of the problem.

The high intensity (51 – 100 %) zones found in the northern half of the Territory, occur in the western districts, viz. Outjo, Omaruru and Karibib. It is also clear from the map that the high intensities are found in the western parts of these three districts. This can be explained by the fact that these districts border on the Namib Desert and being more arid than the rest of the north of South West Africa, sheep and goat-farming is practised. Medium intensity (26 – 50 %) zones are spread right throughout the Territory but occur mostly in the northern half. The problem in the northern cattle-farming regions is mainly rabies and not stock theft as in the south. Low intensity (1 – 25 %) zones are few and far between and interestingly enough, occur in two main groups:

(i) On the central plateau of the northern half between the two deserts. This is probably an ecological phenomenon which is linked with the higher rainfall, more temperate climate and the fact that practically exclusively cattle-farming is practised.

(ii) In the far southern districts of Keetmanshoop and Karasburg, where the only nil intensity zone is encountered. This is surprising as these two districts occupy almost half of the Karakul sheep farming region. It is suspected that the reason for this is that jackal-proof fencing has been erected in these areas for approximately 10 – 15 years and that the population is kept very low by farmers. This is borne out by the fact that the low intensity zones occur on both sides of the Karas Mountains complex which bisects the two districts roughly from north to south. The mountain is bounded on both sides by a flat sandy plain on which it is easier to erect and maintain jackal-proof fencing and control the population.

It must be remembered that the application of organized jackal hunts using dogs, beaters and horsemen as well as all other control methods, such as gin traps, jackal cannons and the coyote getter is easier on level terrain and sandy soil. The animals are also more easily tracked on sandy soil than on the rocky terrain found in the mountain complex.

Another interesting feature of the intensity pattern in the southern half is the fact that the south-eastern corner of the Mariental district shows only a medium intensity (26 – 50 %) problem. It is surprising that this part of the district is bounded in the east by the Kalahari Gemsbok National Park of the Republic of South Africa which has a high density of black-backed jackal. One would expect that this reservoir would overflow into the adjacent farmland, causing a high intensity problem.

4.1.2 Baboon *Papio ursinus* Kerr

The baboon is the second most important problem animal species in South West Africa, as is borne out by Map 2. The medium (26 – 50 %) and high intensity (51 – 100 %) zones are concentrated in the western and southern districts. There are two reasons for this pattern:

(i) Due to the habitat requirements of baboons, the problem is closely linked with the mountain ranges and escarpment zone. There is a clear gap between the medium and high intensity zones of the Karasburg and Keetmanshoop districts which are concentrated in and around the Karas Mountains complex and the medium and high intensity zones running along the escarpment from the Lüderitz and Bethanien districts in the south to Outjo district in the far north.

(ii) Due to the fact that there are no significant cultivated areas in South West Africa, one finds that the problem is linked to sheep and goat-farming. This is evidenced by the medium intensity (26 – 50 %) zones in the northern half of the Territory being found only in the western arid districts of Outjo, Omaruru and Karibib.

The northern half of the Territory is largely covered by a low intensity zone. (See also Table 1). Bearing in mind that mainly cattle-farming is practised in the north, this is most probably the other aspect of the baboon problem described above, viz. damage to water installations, fences etc.

4.1.3 Rock hyrax, *Procavia capensis* Pallas

The hyrax problem is also linked to the mountain ranges and escarpment zone and is therefore, encountered solely in the western and southern parts of the Territory. (See Map 3). These parts are at the same time the sheep and goat farming areas. It is important to note that the hyrax problem does not occur to any appreciable extent north of latitude 26°. This is because the districts in which the problem occurs (Keetmanshoop, Karasburg, Bethanien and Lüderitz) are more arid than the more northern districts on the escarpment. There is less available production and therefore more competition for the available browse and grazing between sheep and hyrax. The high intensity zones (51 – 100 %) occur in the mountainous parts of Keetmanshoop and Karasburg districts. This zone is flanked by low intensity zones to the north-east and south-west of these mountains, mainly due to the fact that the mountains are bounded on either side by sandy plains with very little hyrax habitat.

There is also a clear gap between the medium (26 – 50 %) and high (51 – 100 %) intensity zones of the Karas Mountains complex and the rest of the escarpment region to the west.

Hyrax problems in the northern half of the Territory are of a very low intensity. (See also Table 1). The low intensity problem occurring in the Outjo district is probably *Procavia welwitschii* Gray, the Kaokoveld dassie, which is not a proclaimed problem animal.

4.1.4 Caracal, *Felis caracal* Schreber

Lynx problems occur mainly in the northern and eastern districts indicating that the animals prefer the higher rainfall

sandveld regions to the western arid and mountainous parts, which is possibly because of the dense vegetative cover. (See Map 4). There are very few medium and high intensity zones and these are found in the districts of Keetmanshoop and Mariental near the borders of the Rehoboth Gebiet and Namaland. A further medium intensity zone (26 – 50 %) is found in the north-eastern corner of the Gobabis district on the border with Hereroland and Botswana, also indicating that this problem is due to the animals filtering through from these areas into the adjacent farmland. It is uncertain what the nature of the low intensity problem found in most of the northern districts is, as mainly cattle-farming is practised here.

Most cattle farmers, however, keep small flocks of sheep and goats for domestic consumption and it is possible that losses from these flocks are attributed to lynx. It is possible that the lynx problem is more intensive than is in fact represented here, as farmers sometimes attribute losses caused by lynx to black-backed jackal.

4.2 Conservation problems

4.2.1 Cape hunting dog, *Lycaon pictus* Temminck

Cape hunting dog problems are localized and of a very low intensity (See Table 1 and Map 5), occurring on the eastern borders of the district of Grootfontein, Otjiwarongo and Gobabis and on the northern border of the Tsumeb district. This indicates that the animals only occur in the Bantu Territories and enter the adjoining farmland sporadically.

Shortridge (1934) has described the wild dog as widely distributed in South West Africa. The only game reserve in which they still occur at all is the Etosha National Park. Grobler (1973) says that the status of the animal within the park is worthy of concern, whilst Joubert and Mostert (1975) have stated that they have "now practically disappeared" from the park, and also that it is one of the most endangered species in South West Africa.

We are of the opinion that the conservation status of the Cape hunting dog in South West Africa is most critical. This is due to the increasing development of the Bantu Territories which contain the last surviving populations.

It is, therefore, ironical that the Cape hunting dog is still a proclaimed problem animal, whilst other predacious species such as leopard and cheetah are the cause of greater losses to farmers and are protected.

5 CONCLUSIONS

The five species of legal problem animals in South West Africa can be placed in order of importance, based on percentage problem intensity, as follows: Black-backed jackal, baboon, rock hyrax, lynx and Cape hunting dog.

The distribution of problems for each of the five species is linked to topography, climate, farming practices in the areas covered by the survey and farming practices or lack thereof, in adjacent areas. Bantu Territories play an important part in aggravating problems.

The districts most afflicted by problem animals in general are Maltahöhe, Mariental, Lüderitz, Bethanien, Keetmanshoop and Karasburg. The existence of problem animals in South West Africa is to a very large extent due to the practice of farming sheep in the more arid regions of the Territory and it therefore appears that the sheep farmer requires more far-reaching modifications of the ecosystem in order to farm profitably than does the cattle farmer. The districts most afflicted by problem animals in general are Maltahöhe, Mariental, Lüderitz, Bethanien, Keetmanshoop and Karasburg.

The hyrax problem is very localized and appears not to be as serious as was initially thought to be the case. (Lensing, 1974).

The lynx problem is at present not particularly serious and seems to be under control. The status of the problem does not warrant undue concern and preference should be given to the other species as regards priority of further research and possible management steps.

The intensity of the wild dog problem provides cause for concern as far as the conservation status of the species is concerned and research on this species should be accorded priority over all other problem animal species.

6 ACKNOWLEDGEMENTS

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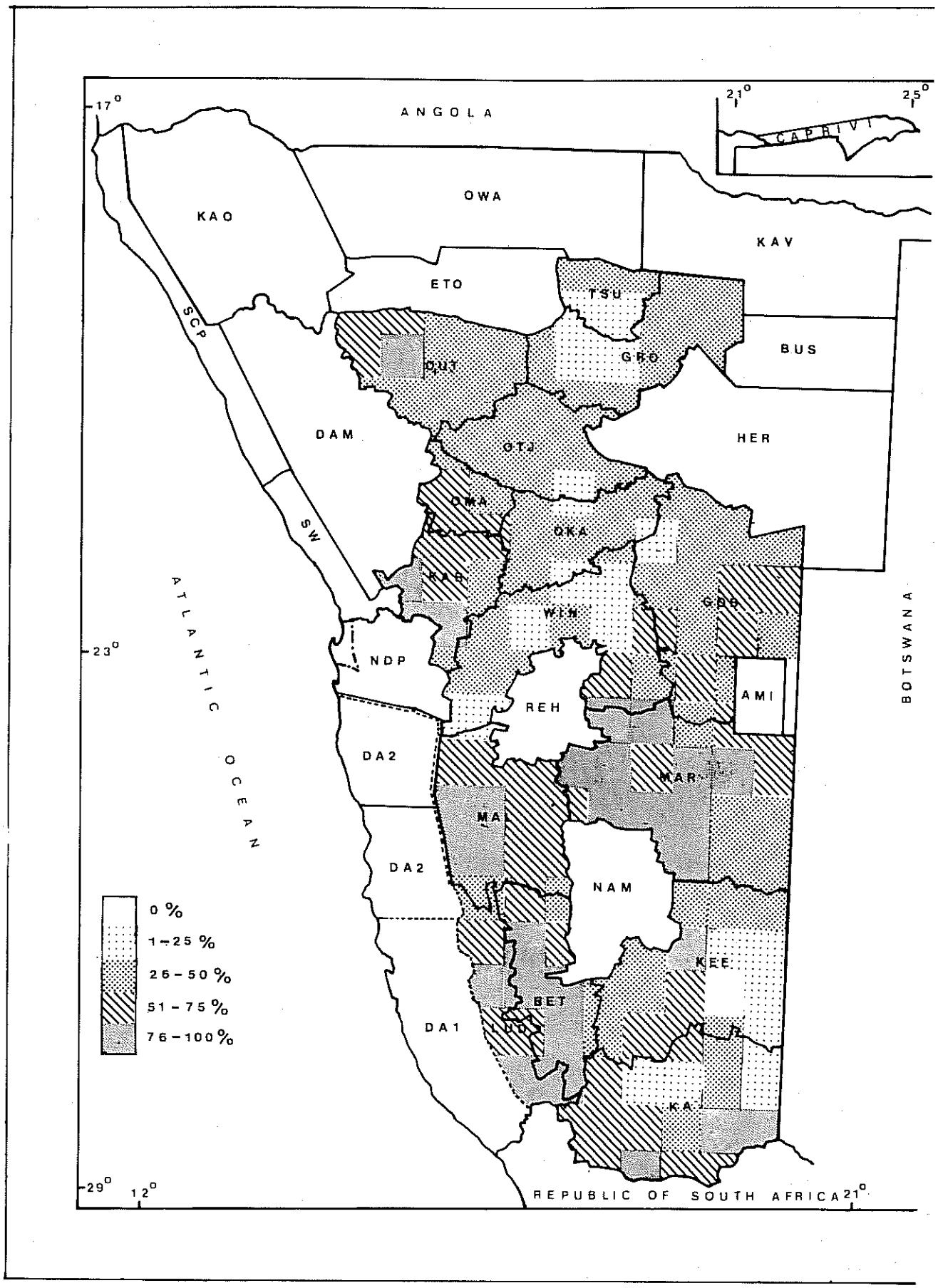
KEY TO MAPS 1 TO 5

Bantu Territories
- KAO– Kaokoland
- OWA– Owambo
- KAV – Kavango
- BUS – Bushmanland
- HER – Hereroland
- REH – Rehoboth Gebiet
- NAM– Namaland
- AMI – Aminius Reserve

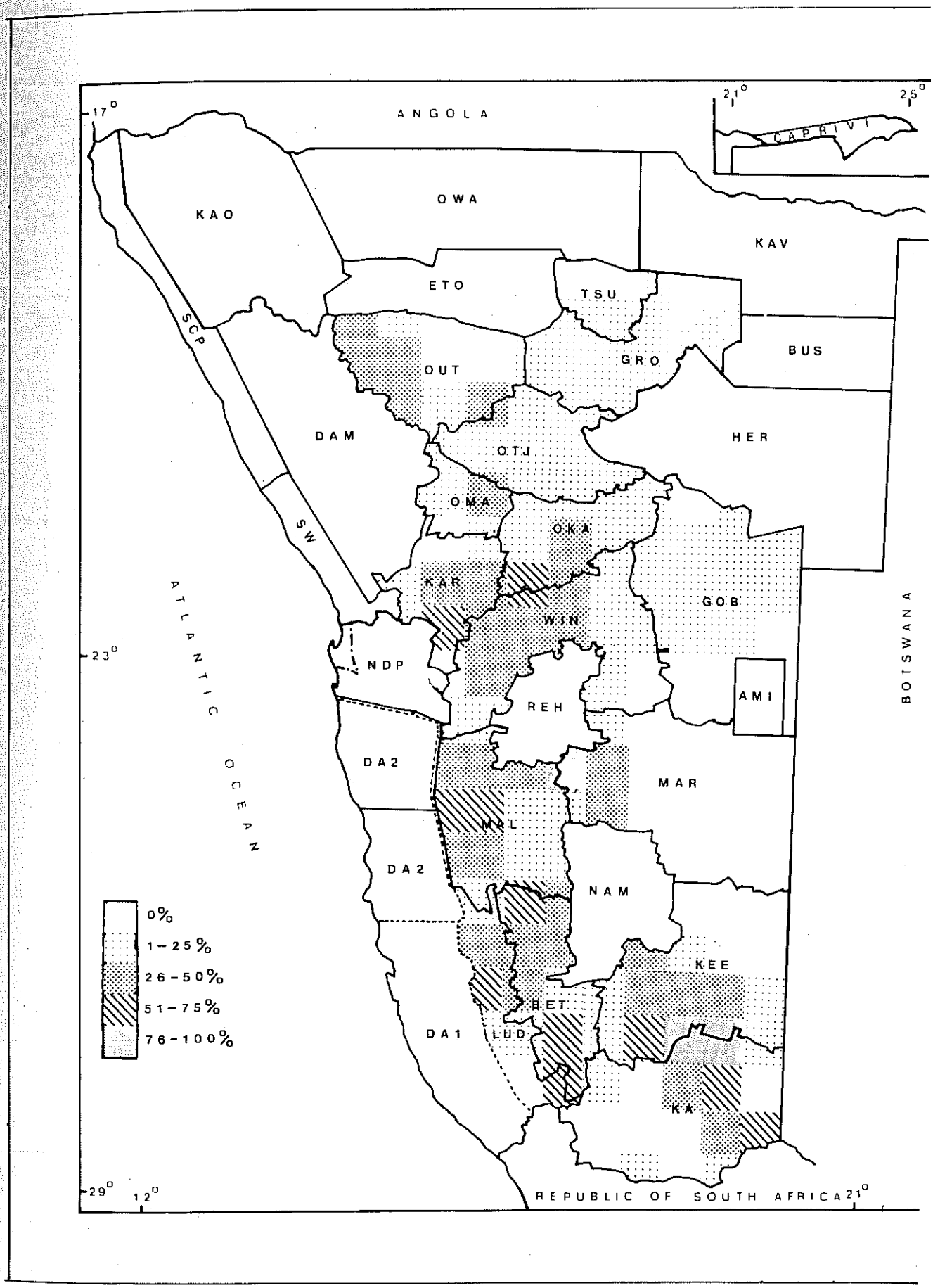
Game reserves
- ETO – Etosha National Park
- SCP – Skeleton Coast Park
- NDP – Namib Desert Park

Districts
- OUT – Outjo
- TSU – Tsumeb
- GRO – Grootfontein
- OTJ – Otjiwarongo
- KAR – Karibib
- OKA – Okahandja
- GOB – Gobabis
- WIN – Windhoek
- MAL – Maltahöhe
- MAR– Mariental
- LUD – Lüderitz
- BET – Bethanien
- KEE – Keetmanshoop
- KA – Karasburg
- SW – Swakopmund

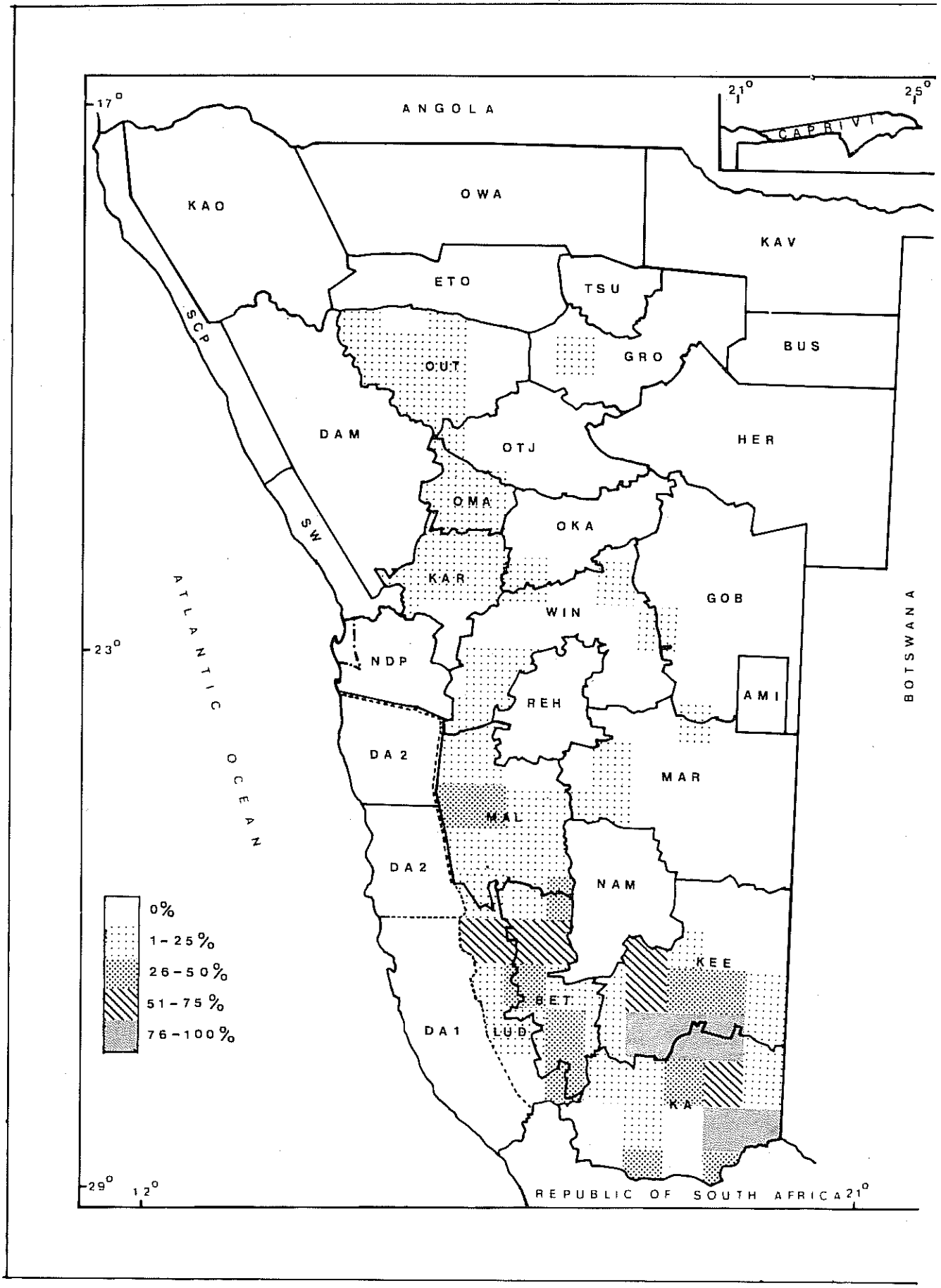
- DA 1– Diamond Area 1
- DA 2– Diamond Area 2



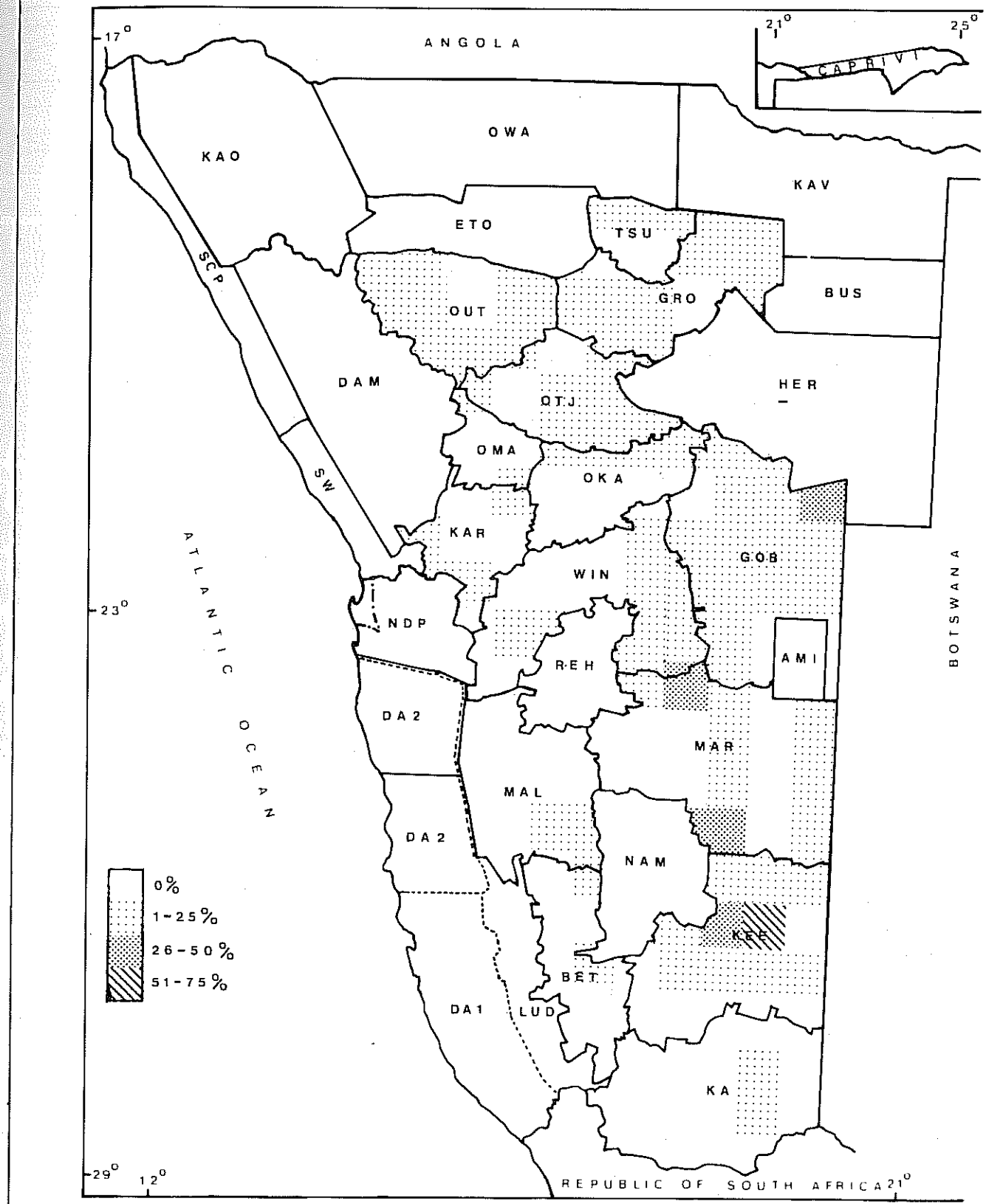
Map 1: Percentage problem intensity pattern for black-backed jackal



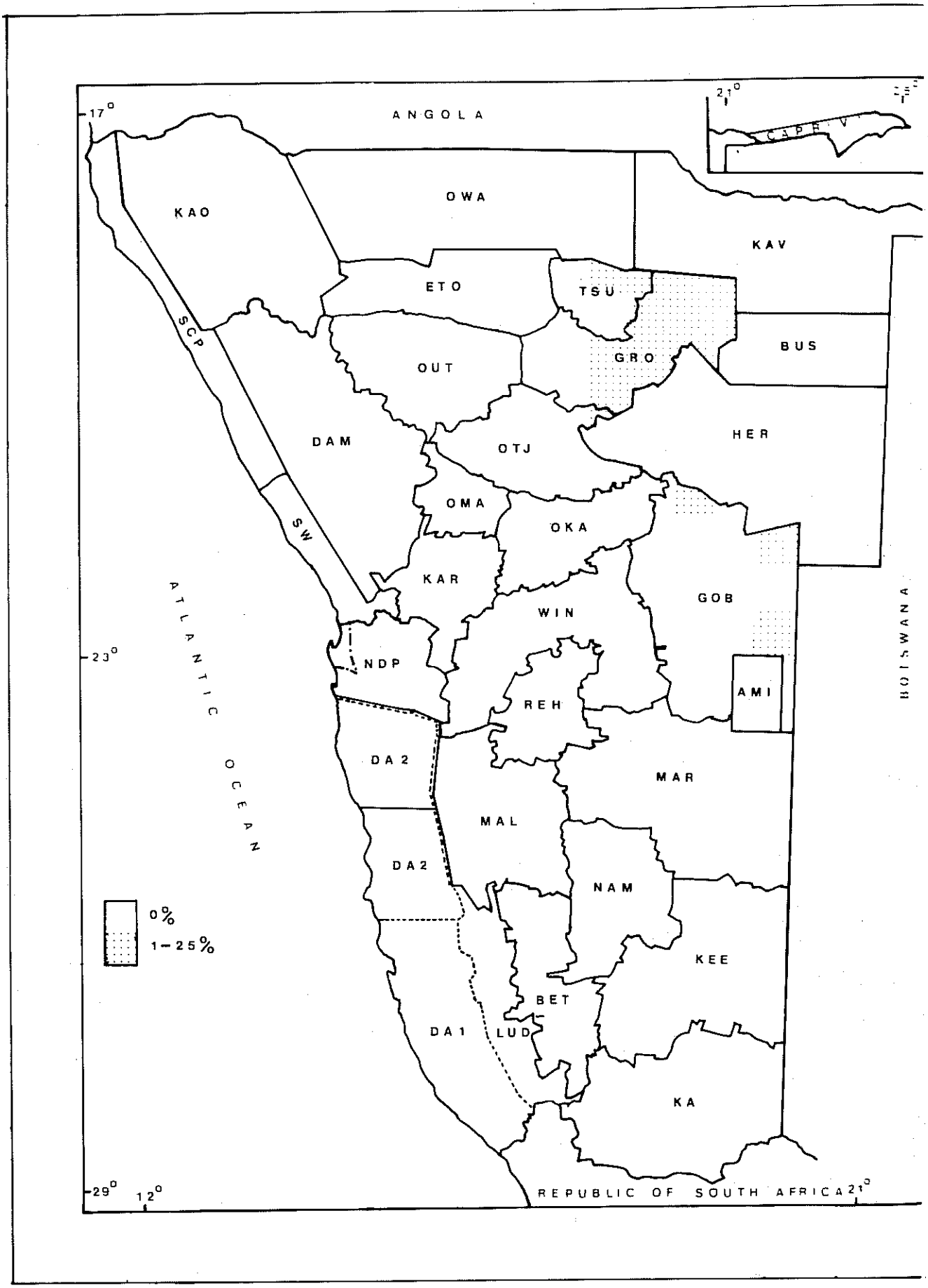
Map 2: Percentage problem intensity pattern for baboon.



Map 3: Percentage problem intensity pattern for rock hyrax



Map 4: Percentage problem intensity pattern for lynx



Map 5: Percentage problem intensity pattern for Cape hunting dog

TABLE 1

Percentage problem intensity values for five species of problem animals in South West Africa.

1/4° Square	Returned* farms	% B.b.j.	% Dassie	% Baboon	% Caracal	% Wild-dog
1817C	19	42,10	0	0	5,26	0
1817D	18	33,33	0	0	5,55	11,11
1818C+1918A	73	27,39	0	8,21	2,73	2,73
1818D+1819C	21	38,09	0	0	9,52	9,52
1914B+1914D	29	55,17	10,34	34,48	6,89	0
1915A	14	64,28	0	7,14	7,14	0
1915B+1915D	32	31,25	3,12	0	0	0
1915C	25	88,00	8,00	40,00	12,00	0
1916A+1916C	29	27,58	0	0	3,44	0
1916B+1916D	55	25,45	0	7,27	3,63	0
1917A	45	22,22	0	17,17	0	0
1917B	41	24,49	0	7,31	0	0
1917C	65	12,30	1,53	13,84	3,07	0
1917D	47	12,76	0	12,76	2,12	4,25
1918B+1918D	61	47,54	0	4,91	1,63	11,47
1918C+2018A +1919A	38	39,47	0	2,63	0	0
2015A	22	50,00	18,18	40,90	4,54	0
2015B	31	25,80	9,67	3,22	9,67	0
2015D	37	40,54	2,70	18,91	2,70	0
2016A	24	54,16	0	29,16	4,16	0
2016B	41	46,34	0	2,43	0	0
2016C	48	35,41	0	12,50	0	0
2016D	45	44,44	0	15,55	8,88	0
2017A	33	36,36	0	3,03	6,06	0
2017B	23	43,47	0	8,69	8,69	8,69
2017C	39	30,76	0	10,25	2,56	0
2017D+2117D	63	36,50	0	4,76	3,17	0
2115A+B	32	65,62	12,50	25,00	0	0
2115D	18	61,11	16,66	0	0	0
2116A	33	39,39	3,03	27,27	0	0
2116B	43	32,55	0	2,32	2,32	0
2116C	22	68,18	0	13,63	4,54	0
2116D	33	33,33	0	24,24	0	0
2117A	51	17,64	0	1,96	5,88	0
2117C	35	31,42	0	28,57	0	0
2117D	40	27,50	0	2,50	0	0
2118A+2018C	34	32,35	0	2,94	2,94	0
2118B	22	68,18	0		13,63	4,54
2118C	36	11,11	0	2,77	0	0
2118D	32	28,12	0	6,25	9,37	0
2119A+C	28	46,42	0	14,28	7,14	0
2119D	16	50,00	0	12,50	50,00	12,50
2215A+C	10	90,00	10,00	20,00	20,00	0
2215B	15	60,00	20,00	46,66	0	0
2215D	8	125,00	0	75,00	12,50	0
2216A	17	41,17	5,88	35,29	0	0
2216B	21	42,85	4,76	71,42	0	0
2216C	24	41,66	0	37,50	0	0
2216D	21	19,04	0	47,61	0	0
2217A	22	18,18	0	31,81	0	0
2217B	31	16,12	3,22	19,35	3,22	0
2217C	18	33,33	0	38,88	0	0
2217D	29	17,24	0	13,79	3,44	0
2218A	40	35,00	0	17,50	7,50	0
2218B	37	35,13	0	5,40	2,70	0
2218C	37	54,05	5,40	13,51	5,40	0
2218D	32	40,62	0	12,50	3,12	0
2219A	32	53,12	0	3,12	9,37	0
2219B	30	56,66	0	13,33	6,66	0
2219C	30	53,33	0	3,33	16,66	0
2219D	31	41,93	0	0	9,67	3,22
2315B	6	50,00	0	0	0	0
2315D+2316C	22	22,72	4,54	18,18	0	0
2316A+B	25	44,00	16,00	36,00	4,00	0
2317A+B	22	72,72	0	18,18	4,54	0
2317D	10	90,00	0	10,00	10,00	0
2318A	27	48,14	0	0	11,11	0
2318B	38	52,63	0	0	7,89	0
2318C	14	100,00	0	0	28,57	0
2318D	18	27,77	5,55	0	11,11	0
2319A	17	29,41	0	0	0	0
2319C	13	61,53	0	0	0	0
2319D+2419B	22	59,09	0	0	13,63	0
2415D+2416C	19	94,73	36,84	57,89	0	0
2415B+2416A	18	55,55	11,11	38,88	0	0
2416B	8	75,00	0	50,00	0	0
2416D	11	72,72	9,09	9,09	0	0
2417A	5	220,00	0	120,00	0	0
2417B	9	88,88	11,11	44,44	0	0
2417C	11	54,54	9,09	9,09	0	0
2417D	6	133,33	16,66	50,00	0	0
2418A	10	60,00	0	0	0	0
2418B	13	92,30	0	0	7,69	0
2418C	9	77,77	0	0	0	o
2418D	13	155,38	0	0	7,69	0
2419A	18	77,77	0	0	0	0
2419C	15	26,66	0	0	0	0
2419D	14	35,71	0	0	0	0
2515B+2516A	14	85,71	14,28	28,57	0	0
2516B+2517A	28	75,00	7,14	25,00	3,57	0
2516C	10	40,00	10,00	10,00	0	0
2516D	12	75,00	8,33	75,00	0	0
2517C	8	50,00	50,00	50,00	12,50	0
2518A+B	12	100,00	0	0	41,66	0
2518D	12	41,66	0	0	25,00	0
2519A	13	30,76	0	0	0	0
2519B	10	50,00	0	0	20,00	0
2519C	18	27,77	0	0	5,55	0
2519D	15	40,00	0	0	6,66	0
2616A+B +2617A	24	75,00	58,33	33,33	0	0
2616C	7	100,00	14,28	57,14	0	0
2616D	13	76,92	38,46	46,15	0	0
2617C	10	80,00	10,00	20,00	10,00	0
2617D	11	36,36	18,18	9,09	0	0
2618A+C	16	50,00	62,50	37,50	6,25	0
2618B	9	111,11	22,22	11,11	33,33	0
2618D	14	57,14	50,00	50,00	14,28	0
2619A	10	20,00	0	0	70,00	0
2619B	17	5,88	0	0	0	0
2619C	11	0	27,27	27,27	0	0
2619D	15	13,33	13,33	6,66	6,66	0
2716A+B	10	60,00	20,00	10,00	0	0
2716D	6	33,33	0	0	0	0
2717A+C	11	90,90	36,36	63,63	0	0
2717B	10	50,00	20,00	20,00	0	0
2717D	8	62,50	12,50	12,50	0	0
2718A	10	60,00	80,00	60,00	0	0
2718B	13	61,53	92,30	100,00	0	0
2718C	8	37,50	12,50	0	0	0
2718D	12	25,00	50,00	33,33	0	0
2719A	10	50,00	110,00	80,00	0	0
2719B	14	14,28	7,14	7,14	0	0
2719C	9	44,44	55,55	66,66	11,11	0
2719D	10	30,00	20,00	0	0	0
2817B+D	8	62,50	0	0	0	0
2818A	7	71,42	14,28	0	0	0
2818B	8	37,50	0	0	0	0
2818C	6	83,33	33,33	16,66	0	0
2818D	9	55,55	0	0	0	0
2819A	9	88,88	88,88	33,33	11,11	0
2819B	7	100,00	100,00	71,42	0	0
2819C	8	75,00	37,50	25,00	0	0

* Total number of farms in quarter degree square calculated to have returned questionnaires.

B.b.j. — Black-backed jackal.