BLACK RHINO MANAGEMENT PLAN

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1. INTRODUCTION

In every country in Africa where the Black Rhinoceros (Diceros bicornis L) occurrs there has been a most serious decline of the species since the beginning of this century. In most countries it is now bordering on extinction.

Kenya is no exception. In many parts of the country this large mammal was, until recently, abundant. During the last decade the decline of the species reached catastrophic proportions and it has now been brought to the brink of extermination. What does make this recent decline exceptional is not only the massive scale on which it has taken place, but the speed with which it has happened. This must represent one of the most appalling examples in Man's history of the destruction of a large mammal.

The Wildlife Conservation and Management Department has become increasingly alarmed over this situation. Anti-poaching measures and the daily surveillance of some seriously threatened populations have been stepped up. Inspite of this, in many areas where this animal was, until recently, common and taken for granted it has now completely disappeared.

The objective of this report is not to describe or review the reasons for this dramatic decline in detail, but to present for consideration recommendations for management measures essential for the survival of the remnants of the species. However, before these recommendations are presented, it is important that the historical background be outlined, for what has happened shows very clearly how rapidly a large animal, until recently common throughout the country, can be brought to the brink of extinction within a few years.

2. HISTORICAL BACKGROUND

At the beginning of this century the Black Rhino occurred in nearly every part of Kenya, except the immediate Coastal strip and the relatively densely settled areas around Lake Victoria. There are a number of diaries and records from that early period, and even as recently as the late 1950's, which indicate that in many places they were very numerous. A Captain Willoughby records in 1887 his party shooting no less than 43 in two weeks near Mzima Springs, which is now in the Tsavo National Park (Willoughby 1889). Percival counted more than 150 while crossing what was then the Southern Game Reserve to Kilimanjaro "several times having six or eight in view at once" (Simon 1962). In the early days of the Tsavo National Park (1948-'52) it was a common occurrence to see anything from 30 - 40 rhino in a morning in the Ol Turesh area (Jenkins 1949) and 67 were seen within 3 hours between the Rombo and Magoine rivers in 1956 (Woodley 1956). A study by Goddard in 1969 of rhino in the Tsavo National Park indicated that the population was of the order of between 6,000 - 9,000. This suggested that the estimate of a total of 2,560 rhino in all of Kenya, which was submitted to the International Union for the Conservation of Nature in 1959, was a gross under-estimate (Game Department 1961). Goddard's figure was arrived at after a large number had died from starvation and malnutrition along the Athi river in the 1960/61 drought. The population for the whole of Kenya in 1970 was considered to be in the order of 20,000 (Western-IUCN Africa Rhino Survey 1980).

However, the decline started at the beginning of the century and as long ago as 1906 there were responsible people in Government who expressed concern about the decrease in the number of black rhino (Simon 1962). Over the years the decline of the species continued as it diminished in numbers and its range contracted, due to farming and new settlement.

In the mid-1940's, for example, over 1000 were shot for this reason in the Machakos and Kitui Districts alone (Game Dept. reports 1958-59) and even as recently as the 1950's 449 were shot by the Game Department on control and over 600 taken by licensed hunters (Game Dept. reports 1950-'59 period).

Rhino have always been subjected to poaching, but towards the end of the 1950's commercial poaching became a serious factor, and the Game Department became increasingly concerned (Game Dept. report 1958/59) about the status of this animal. This concern led to the formation of a Game Capture Unit and the introduction of a policy of translocation, to replace the control shooting method in areas where these animals were in conflict with increasing human settlement. In the 1960's a number of rhino were translocated from high risk, or conflict, areas and placed in safer habitats - mainly in Parks or Reserves. However, none of these translocations had anything but the most minimum amount of scientific background, and there was a high mortality rate from the capture as a result.

The decline of the rhinoceros accelerated from poaching in the 1960's, but in 1963 leopard skins replaced rhinoceros horns as the principle article of the illegal trade in game trophies (Game Department report 1962-63). However, poaching in the 1960's was not the only major cause of rhino mortality. In the Tsavo Park, where poaching had been firmly under control for a whole decade, over 280 rhino died from drought in 1960/61 with further deaths in 1964 and in 1967 (National Park reports 1960/61, 1961/62, 1966/67).

Inspite of the increasing mortality from human and natural causes the species was still widely distributed over much of Kenya at the end of the 1960's, and was still common in many areas both inside and outside National Parks and Reserves. In the early 1970's a dramatic change occurred, and poaching, stimulated by the illegal trade in rhino horn, rapidly became completely out of hand.

In an endeavour to counteract this, the Wildlife

Department deployed additional anti-poaching units and increased surveillance methods in high risk areas. These measures were partially successful, but killings continued to whittle away the rapidly diminishing populations.

By 1980 rhino had been wiped out in many parts of the country, and the remaining populations were seriously reduced and dispersed.

Dear Eric —

I'm afraid the Black Rivers picture for the front cover is not available. No-1 has gone with another band.

Best wishes

Carol Jenkins

3. PRESENT SITUATION

Even with the use of aircraft, rhino can be remarkably difficult to count. However, at the beginning of 1982 the Wildlife Department decided that, before any future long term management plans could be formulated, a country wide survey should be carried out to obtain an up to date assessment of the remaining stocks. Personnel in all the Provinces were mobilised for this census, and the exercise lasted about 4 months.

The results of the 1982 census for the various Parks and Reserves, when compared with the population estimates for the same areas as recently as 15 years ago, clearly revealed a situation that was more critical than generally realised.

3.1 Meru National Park

This area was gazetted as a National Park in 1967, and thereafter twice yearly aerial counts were carried out as part of the management policy. A conservative estimate for the black rhino population in 1970 was 200 - 250.

Serious poaching began in 1975 and by 1978 it was completely out of hand; in that year a "known" 56 rhino were killed within 4 months.

The population in 1983 is considered to be a maximum of 25 - and these remaining animals are widely scattered.

3.2 Tsavo Park

Research work by Goddard in the late 1960's indicated that the population was of the order of 6000 - 9000 (Goddard 1969). This made Tsavo the largest stronghold of the black rhino in Africa.

By 1982 the remaining animals had become so widely scattered over the Park's 20,820 km^2 that it was

3.2 quite impossible to effect even a reasonably reliable census, but it is estimated that there are no more than 100 - 150 left (Woodley pers. comm.).

3.3 Amboseli Park

In the 1940-50's Amboseli was the most famous area in East Africa for rhino, and was considered to support one of the highest known densities. It was usual to see anything from 20-30 rhino within a few hours in the acacia woodlands and swamp area (Kenya National Parks' reports 1951). The population was estimated to be in the region of 150 in an area of approx. 200 km.^{2}. Furthermore, up to the mid 1950's rhino were exceptionally numerous in the entire periphery zones - Bisel, Namanga, Selengai and through to the western slopes of the Chyulu Hills and Tsavo West (Jenkins pers. diaries 1948-1956). To-day none exist in these areas.

By 1977 the Amboseli population was down to 8. There has been no further killings since then, and the population has bred up to 17 (Western pers. comm. 1983).

3.4 Aberdare Park

Up to the mid-1970's rhino were very numerous, especially in the Salient area. The population for the entire Aberdare Park was estimated at that time to be in the order of 600. (Woodley pers. comm.) It was not unusual to see up to 15 together at the Treetops' water hole as recently as the early 1970's. An accurate figure in this type of terrain is impossible to obtain, but the 1982 census revealed 132 in the whole Park and the decline in nightly sightings at Treetops, especially, indicate a dramatic reduction in numbers. In 1979 20 fresh carcases were seen within one month in the Salient area. (Weller pers. comm.)

3.4 At a conservative estimate the population has probably declined by 60% over the last 5 years.

3.5 Mount Kenya

Apart from several corridors in the forest, most of the Park area lies above the 11,000' contour line and never has been significant rhino habitat. Figures for the bamboo and lower forest zone are impossible to obtain, because of the nature of the terrain. However, up until the late 1950's a considerable number of rhino did occur in the lower forests on the western side, especially from Gathiuru through to Naro Moru and Ragati. This population is now virtually extinct.
Undoubtedly some still occur in the dense eastern bamboo zone, but it is impossible to even guess-timate their status. An unsubstantiated report gives the number as 30.

3.6 Nakuru Park

In the early part of this century rhino were very numerous right through the Rift Valley, but disappeared from the Nakuru/Elementeita area completely around the mid-1930's (Simon 1962), apart from a few small pockets on the eastern Mau.
The increasing settlement in this region forced 2 rhino to move into the Park a few years ago. The present number is still 2.

3.7 Nairobi Park

There were no rhino in the Park when it was gazetted in 1946. They did occur in some numbers a few miles away in the Kitengela area, and were very numerous in the Rift Valley between the Ngong Hills and Lake Magadi, and it was not unusual to see anything from 10 - 15 when driving to Magadi. They have now disappeared from this area.
During 1963 and 1964 12 rhino were released

3.7 into the Park from threatened areas, and a further 22 between 1966 - 1968.
The population to-day stands at 21 (Warden, Nairobi Park pers. comm. 1983).

3.8 Maasai Mara

In 1958 Dr. Fraser Darling estimated the rhino population in the Mara - Talek - Sand river area to be approximately 100 (Simon 1962). A survey done by Mukinya in 1973 produced a figure of 180 for the entire Reserve (Western pers. comm). This population declined rapidly due to poaching from the mid-1970's and by 1983 the total known remaining animals in the Reserve, and immediate peripheries, was 28 (Goss pers. comm. 1983) and the majority of these are widely dispersed. Undoubtedly some rhino still remain in the Nguruman escarpment further east, but there are no records of the numbers there either in the past or present.

3.9 Other Areas

Remnants of former populations, mainly in ones and two's, still remain in inaccessible terrain in some parts of North Ukambani, North Tharaka, Ndotos, Mathews, Maralal and Kerio areas. However, the numbers are not significant and as the animals are widely scattered they have no long term future, and will almost certainly die out.

3.10 Private land

Two viable rhino populations still exist on privately owned ranch land.
The Laikipia Ranch is reputed to hold 70, on 98,000 acres. This figure could be on the high side. The Wildlife Department survey in early 1982 revealed only 32, but the nature of the terrain makes an accurate census very difficult.
Solio Ranch is holding between 65 - 70 in a 15,000 acre totally fenced private Game Reserve.

3.10 There were none on the ranch in 1960 and the present owner re-introduced them in the late 1960's. From the original re-stocking they have been successfully built up to their present numbers. In addition there are 26 white rhino, from an original stock of 16 introduced from the Natal Parks.

3.11 Summary

From the known figures in the areas mentioned the total population is now in the order of 540. Allowing for the widely scattered individuals and small groups which "may" still exist in the North and North West the total population for the entire country is very unlikely to exceed 700 at the most - and it could be less.

Within a period of 13 years (1970 - 1983) the rhino population has plunged from an estimated 20,000 to approximately 700. These figures very clearly attest to the serious plight of Kenya's black rhino. It is now at a crisis level and on the brink of extinction.

4. SURVIVAL CONSIDERATIONS

With the exception of the female with young, black rhino are a solitary and very sedentary species. They are very regular in their movements, although their home ranges vary considerably according to availability of food and surface water. These characteristics make the distribution of the animal equally as important as numbers for their survival; if they are widely scattered they are unlikely to meet up often enough and there will be no - or insignificant - recruitment. This has already occurred in other parts of Africa. (Hall Martin pers. comm. 1982). The natural habits of this animal make the situation all the more critical.

Furthermore, with the exception of 3 or 4 areas, the remaining populations are now so small that in-breeding will force a serious constraint on future viability, and even if all killings could be prevented it is likely they will disappear of their own accord - unless special management is quickly implemented.

5. VARIOUS MANAGEMENT OPTIONS

Over the last 5 - 6 years the plight of the rhino has attracted much attention both from official sources, and interested individuals, not only in this country but from all over the world. Various international conservation organisations have become involved and others have been created purely because of the rhino situation. Much debate has taken place and the range of ideas and proposals has been as numerous as the experts who have suddenly appeared on the scene. Undoubtedly all have genuine concern and mean well, however, none of these ideas and efforts have been co-ordinated, and many of these bodies operate in isolation from one another.

Inevitably too, the main issue has often become clouded by sentiment and personalities, and long term management requirements have become confused. The result is, that apart from the Wildlife Department stepping up anti-poaching and general surveillance - which can only be holding measures at the best - no constructive long term management policies have yet been decided on. While the problems and the "pros and cons" of various management options are endlessly debated and argued about rhino continue to be killed. All sorts of solutions have been suggested to insure the survival of the black rhino. Some of the ideas most frequently voiced are -

5.1 "De-horning of all rhino, so that they would no longer be commercially attractive."

This is a persistent recommendation and, in fact, is not new. As long ago as 1950, when the Wardens in Tsavo first became concerned about rhino poaching, this idea was put forward by an apparently renowned international conservation figure.

5.1 In practical terms the idea does not merit serious consideration.
Even if every single rhino could be de-horned, which it could not, the costs would be prohibitive. It would be shameful for the animal, unnatural and idealistic; the horn was provided by nature for defence and domination, the horn grows again and, lastly but most important (as any field Warden knows) the poacher does not look at the horn before killing the animal! It would serve no purpose at all, and must be dismissed as a "crank" idea.

5.2 "Daily surveillance and guards on all rhino" (as is now being carried out in Maasai Mara).

A large number of men are required with their attendant expenses, and even in easily accessible country like Maasai Mara it is physically impossible to monitor every single rhino all day and every day.
Even in small areas where rhino have been concentrated and subject to close scrutiny by anti-poaching units and tourists, rhino have disappeared rapidly - Amboseli is a classic example. Apart from this, with the remaining animals as widely scattered as they are, surveillance will not impregnate a female who has no contact with a male! It can only be a holding measure, and will not ensure the long term survival of the species.

5.3 "Further research is needed to obtain more information on optimal rhino densities before any management can be planned and implemented."

There is no basis for this argument and, in any case, time is the one commodity that is no longer available.

5.4 "The creation of Special Sanctuaries for rhino".

This was recommended by the Warden, Meru Park in 1980. Rather surprisingly, this is the one proposal that most of the current experts shy away from. Various arguments are put forward against it; the main ones

5.4 are -

i. Enclosed sanctuaries would be artificial.

ii. The situation is not serious enough to warrant this sort of management.

iii. By confining a number of animals in an enclosed area, conditions for poachers would be easier.

iv. In-fighting could occur.

v. There will be in-breeding and over population.

vi. It will be too expensive.

6. SPECIAL SANCTUARIES

In view of the serious situation that faces the rhino in this country it is surprising that the concept of Special Sanctuaries is treated either with scepticism or, at the best, a luke warm response by many.

Assuredly, there might be some merit in some of the arguments against this type of management. It is not pretended this solution is perfect. However, opponents of the Special Sanctuary plan must bear in mind three realities:

i. Apart from the Aberdare Park and on 2 privately owned ranches, the rhino population is now so scattered and fragmented that the species is highly unlikely to ever build up again - even if all killing ceased immediately.
It is a simple question of the distribution of the remaining animals.
In at least 2 areas in Southern Africa rhino that had become scattered due to poaching died out, even though all poaching was stopped. (Hall Martin pers. comm. 1982).

ii. In South Africa to-day almost half of all the black rhino in the country occur in populations which have been artificially established by translocation. (Hall Martin pers. comm. 1983).

iii. Anyone doubting the feasibility of Special Sanctuaries should first look at the private Game Reserve on Solio Ranch.
There were no rhino on the Ranch when the owner created this Reserve. The original stock were all translocated. For its size the Reserve now carries the highest rhino density in the country.
This private Reserve is an object lesson on what can be done to preserve rhino.

It is believed that the creation of Special Sanctuaries in different areas should now be urgently considered. Preferably, they should be within existing National Parks. However, if private land owners, who have suitable habitat and are prepared to finance such operations, wish to contribute towards a "National" rhino protection plan, they should be encouraged - providing they conform with an overall management policy for the species. The creation of these Special Sanctuaries will be expensive and will require careful and sound long term management policies.

6.1 MANAGEMENT REQUIREMENTS FOR SPECIAL SANCTUARIES

Proper legislation (if on private land), security of the area, provision for water, controlled burning of the range if necessary, fencing and removal of animals to other areas when necessary to prevent in-breeding or over stocking, are the management requirements to any well run conservation scheme.

A. Security

The history of the black rhino in this country and the events of the last decade have clearly shown that poaching has been the major factor by which the species has been exterminated over most of its range. Habitat alteration has played a very minor, secondary, role and in Tsavo rhino still existed in large numbers even after elephant had reduced the bush lands.

Only if good security is afforded will the survival of the species be assured.

It is not intended in this paper to dwell on the surveillance methods which will be necessary, other than to say that adequate protection from poaching is essential and is the most basic management requirement, if the survival of the species is to be guaranteed - or even considered.

B. Fencing

Rhino Sanctuaries must be properly fenced and must include electrification to prevent rhino leaving the sanctuary area. This is a prerequisite for establishing

B. a new population.
The configurations of these fences will vary in different areas, depending on what types of other wildlife are to be included, or excluded, from the sanctuary area and the local security requirements.

C. Water
There must be adequate permanent water supplies well distributed throughout the sanctuary. Where water is not available it will have to be provided.

D. Burning
The use of fire as a management tool must be studied and understood for each sanctuary. The reasons for burning will vary from place to place, depending on the desire to stimulate a specific impact on certain plant communities in order to create or maintain a balance between woody plants, grasses and herbs. Also where there is a shortage of herbivores an increase in grass cover could result in accidental hot fires, which might be detrimental to the thickets providing the main food source for rhino.

E. Staff
Each sanctuary will require its own attendant permanent staff to cater for routine patrolling/anti-poaching, surveillance, fence and water supply maintenance and any other management requirements. The establishment strength will vary with different areas, and each one will have to be considered on its own merits. A senior officer should be appointed to co-ordinate and supervise the routine management of all special sanctuaries.

F. Translocation
This will be a vital prerequisite for the success of these areas, not only for initial stocking purposes but also for on-going management to prevent over stocking and in-breeding.

F. Rhino translocation is a highly specialised operation requiring special equipment and carefully selected, well trained personnel; with modern methods it is believed mortality can be kept to under 1%.
The Wildlife Department's Capture Unit has not had experience in large scale translocation exercises, and before this can be embarked on it will be essential to up date equipment and techniques. If this is not done the results would be disastrous.
The Natal Parks translocate hundreds of rhino every year, and it would be appropriate to study their latest methods.
Experience in other parts of Africa has shown that rhino should be kept in bomas for 2 - 3 weeks after capture, and must not be released together irrespective of sex (Hitchins pers. comm. 1983). Close surveillance and monitoring of released animals is also vital.

G. Research
A small research team should be specifically assigned to the sanctuary areas, but other than detailed ecological and behavioural studies all research must be for management requirements, with a few simple measures routinely monitored.

H. Population density
Population densities will vary with every area, depending on the suitability of habitat, water and sex ratio; where artificially high densities are created stress within the population can arise, resulting in fighting and lowered reproduction.
The initial stocking should be kept low, in order to reduce the calving interval and maximise on reproduction. Birth intervals must be recorded and once these increase greatly, surplus animals must be moved to new areas.
In 1969 Goddard defined the density stratum for Tsavo Park as:

H.

Very high density	1.5 rhino per km.^{2}
High density	1.0 " " "
Medium density	.5 " " "
Low density	.2 " " "
Very low density	.04 " " "

I. Stud Book

In every sanctuary situation full details of every individual rhino must be maintained where possible in the form of a Stud Book.

Records must be kept and up dated to include not only sex, age where known (or approx.), place of origin, date introduced into the sanctuary, full particulars of any calves born, including mother and, if possible, father and other relevant details. These particulars can be kept in a card index system with close-up profile photographs (if possible) of each animal, showing any peculiarity of horn shape and ear notches, and any other marks, for identification purposes. These records should be mandatory and uniform for all sanctuaries, including those on private land.

J. Veterinarian

The services of a competent and experienced veterinarian who can be called on will be needed, not only for treatment of any injuries but also to carry out full post mortems when necessary. Obviously, in the interests of uniformity, the same person should be responsible for all areas under special sanctuary status.

K. Stocking

Obviously there will be no point in establishing rhino sanctuaries unless it has been determined beforehand where the initial stocks are to come from. This will call for a re-assessment of the present scattered populations and groups in all the Parks, Reserves and outside areas to determine -

K. their distribution, numbers, if the population is viable, in-breeding aspects either now or in the future and their security, in order to decide which rhino should be translocated and to where.

Conclusion

The essence of the sanctuary scheme is to provide a pool, which can - with successful breeding - produce enough animals to start re-introduction or provide essential additions to other areas.

7. NATIONAL RHINO MANAGEMENT COMMITTEE

As the overall rhino situation has deteriorated so has there been an increase in concern, and direct or indirect involvement, from various organisations, specialist groups, committees, individuals and private land owners. All have the same goal, but the final result has been, more often than not, a lack of liaison, duplication, divided ideas, sentiment and a general lack of co-ordination of effort and policy.

The Wildlife Department must now draw up a long term rhino management policy. It is recommended that a "National Rhino Management Committee", under the Chairmanship of the Director, Wildlife Conservation and Management Department, should be created to formulate and implement a National rhino policy, and to monitor the future management of any areas which are specifically created for rhino.

All interested organisations and individuals, both overseas and locally, should channel ideas, efforts and funding requirements through this committee. The committee will need clear terms of reference and must not be by-passed.

If this is not done the current debates on the rhino situation will still be continuing long after the last rhino has disappeared.

8. SANCTUARIES ON PRIVATE LAND

Unquestionably certain private land owners have made vital contributions to rhino conservation, especially on some of the large ranches in Laikipia district. The owners are maintaining and providing protection for these animals at considerable expense to themselves, inspite of the fact that under the laws of the country all indigenous animals are the property of the State.

The importance of the conservation efforts made by the private sector are not generally appreciated, but on the whole they have been more successful in conserving rhino than the Parks and Reserves have. For example, 2 of the 3 remaining viable populations are on Solio and Laikipia ranches. There are other ranchers who are also prepared to outlay the costs of fence construction and surveillance for rhino on their land. The importance of these private land sanctuaries is enormous to any future rhino management plan. This should be recognised and encouraged, but they must be intergrated into a National policy.

The legal status of private land rhino sanctuaries needs defining and they should be registered as part of an overall National rhino management scheme, to give them accountability with International conservation bodies in the same way as the Government sanctuaries.

The land owners' independence must obviously be respected and they must be afforded certain guarantees, that if they are going to incur these considerable expenses they will be allowed to keep rhino on their land. In return they must conform to management requirements for a National policy. Unless this is done with sensitivity the gains made by the private sector in protecting rhino could be lost.

A National Rhino Committee should lay down a management criteria for all sanctuaries, and the ranchers should have a representative on that Committee.

9. PROSPECTIVE RHINO SANCTUARIES

The Senior Warden Planning (Northern) addressed a confidential report to the Director, Wildlife Conservation and Management Department, headed "Rhino Situation", reference SW/PL/N.W.-RHINO dated 5th May, 1983. Resulting from this the Director issued instructions for 2 earlier reports to be up-dated:

i. "Rhino Project - Meru National Park" dated 25th February, 1981;
(This was a follow up to a report written in 1980)

ii. "Preliminary Survey for Proposed Rhino Sanctuary - Tsavo National Park" dated May, 1981;

and further, to examine the feasibility, and make necessary recommendations, for creating Special Rhino Sanctuaries in other National Parks and Reserves.

Accordingly a survey was carried out of the following areas:

Maasai Mara National Reserve
Bogoria National Reserve
Lake Nakuru National Park
Aberdare National Park
Tsavo National Park
Meru National Park

When investigating the feasibility of Rhino Sanctuaries in various areas two options were considered -

A. One large area with a suitable habitat and adequate water for a substantial population.

Such an area exists at Loinek. This is presently an LMD holding ground. However, certain factors such as whether this area could be acquired or made available, possible requirements for other land use in the future

A. and potential security problems ruled this out.

B. Several small sanctuaries within already gazetted National Parks/Reserves.

It is considered this option would be preferable, as apart from other factors the land status is already defined.

Full details of the findings of the surveys appear under Appendices I - VII, with up dated information on rhino status in other relevant areas.

10. CONCLUSION

The decline of the Black Rhinoceros is now history. In just over a decade the species has been brought to the brink of extinction, and this clearly demonstrates how suddenly an animal, which was once taken for granted, can virtually disappear.

The international trade in rhino horn and the astronomical prices the commodity now fetches has been responsible for a most thorough elimination of the species throughout the country. The plight of the rhino has received much attention and been the subject of endless discussions by a number of specialist groups, both overseas and locally. Various international agencies have been instrumental in persuading some major importing countries to ban the trade, but whilst this has been a vital contribution towards rhino conservation so far no management plans for the few remaining animals have been decided on. It is no exaggeration to say that the fate of the rhino will be sealed within a decade, unless a long term management policy is effected.

The establishment of Special Rhino Sanctuaries will not only need considerable capital investment but will require a new form of skilled and sympathetic management. There must be no delay in the implementation of a new policy, as time is the one commodity no longer available. Unless an effective, country wide management plan is quickly implemented it will be too late, and posterity will not forget or forgive our dereliction.

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Mr. P.H. Hamilton, Senior Warden Tsavo East, assisted with an aerial survey of the Aberdare Salient and has made a number of useful comments for this paper.
Mr. C. Francombe, manager of Laikipia Ranch has kept me informed with information on rhino in that part of Laikipia. Mr. J.C. Sutton supplied much useful background information. Dr. A. Hall Martin, Senior Research Officer, Kruger Park and Mr. P. Hitchins, ex-Natal Parks and an authority on rhino, have maintained a regular personal correspondence over the last year answering a number of questions and giving much useful information on rhino translocations.

A number of officers of the Wildlife Department have given every assistance to up date the rhino information in their respective areas; their help is much appreciated. Mr. W. Asava, Provincial Senior

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APPENDIX I MERU NATIONAL PARK - RHINO SANCTUARY

I.1 Introduction - Background

Black Rhino

Up to the early 1970's the Meru National Park was considered to have the highest concentration of Black Rhino in Northern Kenya. The population for the Park area (828 km^2) was estimated at 200 - 230 with another 30 - 40 in the periphery areas and the majority of these were in the Bisanadi Conseration Area.

The dramatic increase in the world price of rhino horn led to a wholesale, and widespread, slaughter and by 1983 the population inside the Park had been reduced to about 25. Rhino in the periphery areas had been virtually exterminated.

White Rhino

In 1966 six juvenile White Rhino (3 males, 3 females) were introduced into Meru Park from the Natal Parks. This was not a viable group and the project was treated as a 'pilot scheme', with the intention of obtaining more animals at a later date. Between 1970 and 1976 three calves were born, however in-fighting occurred as the animals reached maturity and between 1969 and 1974 three died of injuries from fighting (2 males and 1 female). This in-fighting was undoubtedly caused by the animals being too closely confined. Accordingly, they were released and the result was, in 1977, a group of 3 were shot by Somali poachers. The remainder were then rounded up and brought back to the Park Head Quarters for closer supervision. They are now kept under guard and paddocked at night.

It is 17 years since these animals were first introduced and the population stands at the original number of 6 animals. (2 males, 4 females) Two of these females are from the original stock. Not only are these females coming up to the end of their

I.1 reproductive lives (over 20 years old) but there is now, inevitably, in-breeding and no calves have been born since December 1980.

I.2 Conclusion

Black Rhino

The remaining animals are widely scattered, have adopted small territories and tend to remain in thick cover. It is considered they are no longer a viable population and, even if there is no further mortality from poaching, they will eventually disappear.

White Rhino

These never were a viable group and, not only are 2 of the females almost past their breeding span, they are all in-bred.

Unless there is further translocation of new stock these animals will die out.

1.3 Proposal

i. A Special "Rhino Sanctuary" be created inside the Meru National Park for both the remaining black rhino and the captive white herd.

ii. Additional white rhino be obtained to supplement the present numbers and prevent further in-breeding.

1.4 Rhino Sanctuary

A suitable area for this purpose is the Kinna Triangle (Map - Appendix I.A).

Boundary description: from the Murera River along the Park's N.W. boundary line to its Northern corner at Kithima ya Mugumo, thence due South along the Park boundary to the Murera River, along its South bank upstream in a N.W. direction to point of commencement.

1.4 Boundary description cont: Total area-approx. 40 km^2.

1.5 Vegetation

A survey of the vegetation of the entire Park was carried out by Mr. P.H. Hamilton between 1976-1980.

1.6 Water

The area is well watered by the Kithima ya Mugumo Spring, Kinna Ndogo Spring, Bisanadi and Murera Rivers.

1.7 Fence

i. The Park's North West boundary is already fenced from the Murera river to the north corner at Kithima ya Mugumo, and south again to the Kinna Ndogo river. This fence is 8' high with steel posts in concrete, supporting 13 strands of high tensile steel wire.
Total distance now fenced - 11.5 km.

ii. The Park's North South boundary from the Kinna Ndogo river to the Bisanadi river is currently out to contract to be fenced.
The fence will be 5'9" high, with wattle posts supporting 9 strands of high tensile steel wire, plus outrigger assemblies for 2 electric wires at a height of 7'6" and 3 intermediate electric wires.
Total distance out to contract - approx. 4 km.

iii. The distance remaining to be fenced is approx. 14 km.
The total distance of fence will be approx. 30 km.
The entire fence must be electrified, including the existing fence from the Murera river - Kithima ya Mugumo - Kinna Ndogo section.
Monitoring units will be necessary for the fenced area.
(Appendix I.B - suggested design for fence).

I.8 Entrance Gate

There should only be one entrance gate to this Sanctuary. This could be situated at the Park entrance at Murera, thereby the one gate will serve as entrance to the Park and also the Rhino Sanctuary.

It is recommended that a separate entrance fee should be charged for entry to the Sanctuary.

I.9 Patrol Base

The rhino sanctuary would require its own patrol base. This should be situated at the Kinna Ndogo Spring, with attendant staff for patrolling the area daily and maintenance of the fence line. The Warden, Meru Park, would be responsible for all routine administrative matters, and would be directly responsible to the National Rhino Committee for management matters effecting the sanctuary.

I.10 Roads

A road net work already exists. Additional circuits should be constructed and the entire net work up-graded to all weather standards.

I.11 Other animals

It will be necessary to exclude certain animals from the sanctuary area - especially elephant and any large herds of buffalo. These can be driven out by use of a helicopter and efficient electrification of the fence should ensure they do not return.

I.12 Fires

The Warden, Meru Park, must take measures to keep all fires out of this area from now on.

I.13 Funding

It is beyond the scope of this paper to make detailed estimates, but it is considered that the cost of completing the fence, plus extra electrification for the existing line would be in the region

I.13 of £80,000.

Additional to this will be the cost of -

i. Clearing of the fence line.

ii. Construction of a Gate

iii. Construction of patrol base and fence maintenance camp.

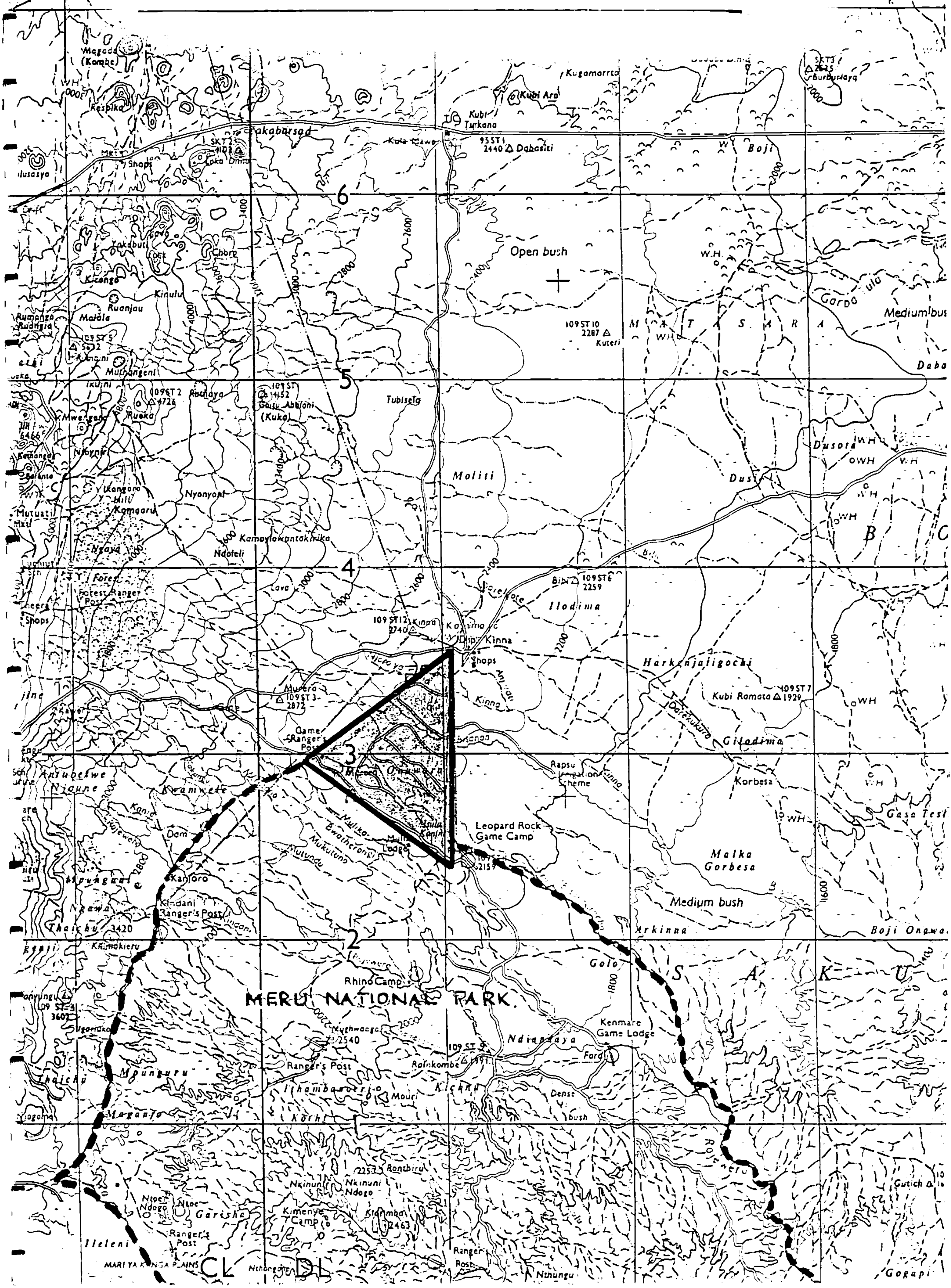
iv. Translocation to stock the sanctuary.

v. Additional roads, and improvements.

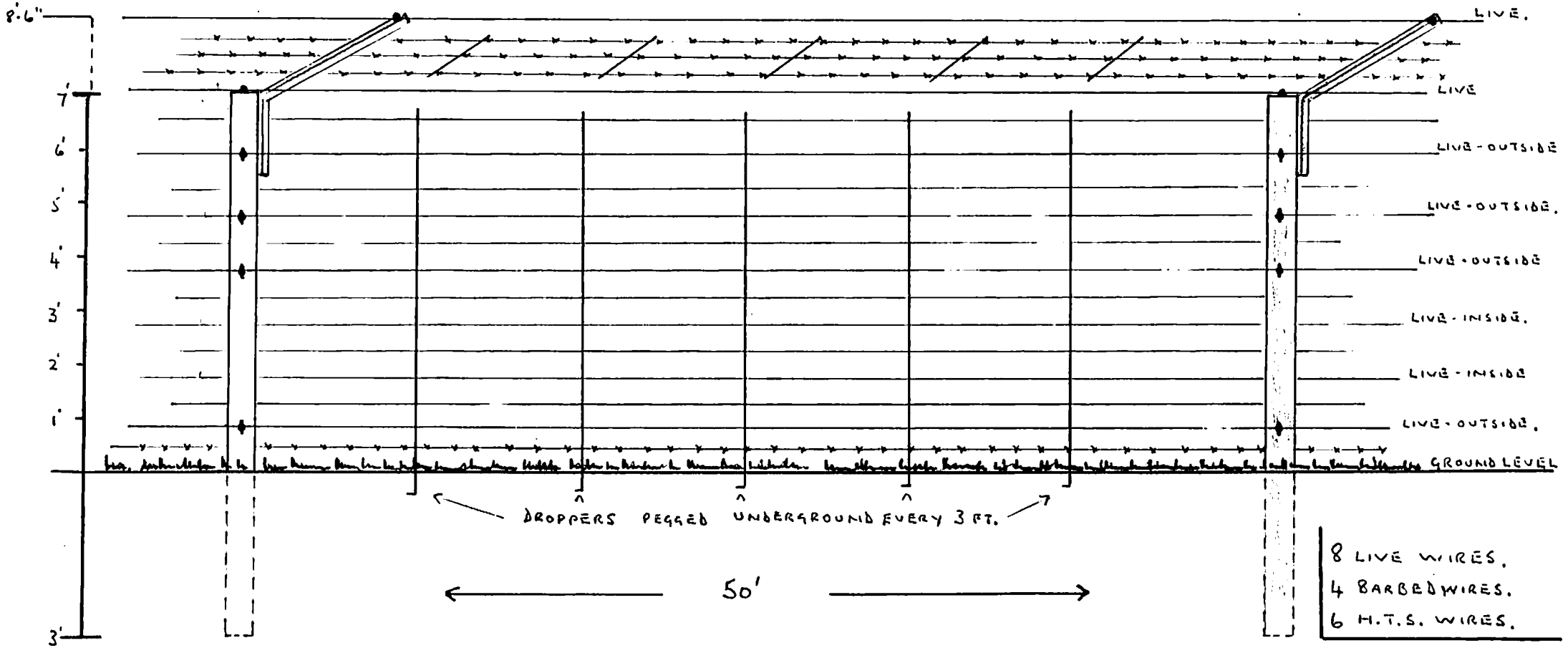
I.14 Recurrent Allocations

The Sanctuary should have its own recurrent allocations.

APPENDIX I.A MERU PARK - PROPOSED RHINO SANCTUARY



APPENDIX I.B SUGGESTED DESIGN FOR FENCE EXTENSION



APPENDIX II TSAVO NATIONAL PARK - RHINO SANCTUARY

II.1 Introduction - Background

Black Rhino

Up to 1970 Tsavo National Park held the largest concentration of black rhino remaining in Africa. The census carried out by the Tsavo Research Project under the direction of Dr. J. Goddard in 1969 gave an estimated population for both Tsavo East and Tsavo West in the order of 6000 - 9000 (Goddard 1969).

Distribution data from the census showed a very high density of rhino astride the upper Athi River, along the entire Yatta Plateau and between the Ngulia Hills and Tsavo River. It should be emphasised that the density pattern was plotted after a major die off had occurred during 1960/61 and 1964 from drought (approx. 280 animals). It must also be pointed out that Goddard's survey was carried out after the rhino population had already been seriously depleted in Western Tsavo in the Rombo/Ol 'Turesh and adjoining Maasai Reserve areas by Chagga gangs, armed with rifles. This had occurred in the late 1950's, early 1960's.

Poaching had always been a problem in Tsavo, but in the mid 1970's Somali gangs, armed with rifles and automatic weapons, made their first appearance and the situation rapidly became out of hand and within a few years rhino had been wiped out over large areas.

II.2 Conclusion

The remaining rhino are now so widely scattered over the Park's 20,820 km^2 that it is impossible to give reliable figures of the remaining numbers, but it is thought to be no more than 100 - 150 and it could be less. Not only is the population now at a dangerously low level but it is very widely dispersed. It cannot be considered a viable population in its present state any longer. The eventual fate of the

II.2 Tsavo rhino can be predicted, unless urgent management steps are taken.

II.3 Proposal

A Special Rhino Sanctuary be created in Tsavo West. A preliminary survey was carried out at the end of April, 1981, by the Senior Warden Planning (N.W) and Senior Warden Planning (N.E). The detailed report of this survey, with recommendations, was forwarded to the Director, Wildlife Conservation and Management Department in May 1981.

II.4 Rhino Sanctuary

The most suitable area for a rhino sanctuary is the Chamwie - Ol 'Turesh - Magoine - Kitani triangle.
(Appendix II A - Map - Proposed Area).
Boundary description - from the point where the main Amboseli/Kilaguni Lodge road crosses the Western boundary of Tsavo West just North of Chamwie hill in a South Westerly direction along the present boundary of the Park, for approx. 18 km. to just N. of the Magoine river, thence Easterly avoiding the Magoine flood plain for approx. 15 km. to a point just West of the Tsavo/Ol 'Turesh rivers junction, thence northerly through Signal hill for approx. 6 km., thence north westerly along the edge of the Mzima lava flow back to point of commencement.
Total area approx. 160 km.^{2}

II.5 Vegetation

A preliminary vegetation survey of this area was carried out by Mr. P.H. Hamilton and is included in

II.5 the report headed "Proposed Rhino Sanctuary Tsavo National Park", dated May 1981.

II.6 Water

The Ol 'Turesh river, which flows through the proposed sanctuary area in a South Easterly direction, the Dutone Springs and Kitani Springs.

Because of the size of the area additional water points would be needed. Water could be piped from the Ol 'Turesh river to a storage tank situated on Poachers' Look Out hill and gravitated from there to 3 - 4 artificial water holes which would be situated in the North West corner of the proposed area.

II.7 Fence

The sanctuary should be enclosed by fencing, with electrification and monitoring systems. Because of the common boundary with the Maasai Reserve the security factor must be considered when designing the fence.

Total distance of proposed fence - approx. 70 km. (Appendix II B - suggested configuration for fence the same as the one for Meru).

II.8 Entrance Gate

Two entrance gates will be needed. It is considered a separate entrance fee should be charged for entry to the sanctuary area.

II.9 Patrol Base

The sanctuary will require its own patrol base, and attendant staff for patrolling and fence maintenance. Maintenance camps should be constructed along the fence line every 10 km.

The Warden, Tsavo West, would be responsible for the routine administration and would be directly responsible for rhino management to the National Rhino Committee.

II.10 Roads

Some roads already exist, and certain circuits need improvement. Additional circuits will be required in order to cover the area properly.

II.11 Other animals

Elephant should be excluded from the sanctuary area.

II.12 Fires/Cattle

A dramatic regeneration of important rhino browse is now occurring throughout the proposed area and much of this is at a critical level of growth.

Illegal grazing by Maasai cattle in recent years has presented serious problems in this area and this, coupled with fires, could jeopardise the regeneration of woody vegetation. The Warden, Tsavo West must take firm measures to control the illegal grazing and fires.

II.13 Funding

It is beyond the scope of this paper to submit detailed costings for this project, but at present day prices it is considered this would be in the order of £350,000 for the construction of the fence with electrification. Additional cost factors will need to be considered -

i. Clearing of the fence line.
ii. Construction of gates.
iii. Construction of patrol base and fence maintenance camps.
iv. Translocation costs.
v. Additional roads.
vi. Water supplies.

II.14 Recurrent allocations

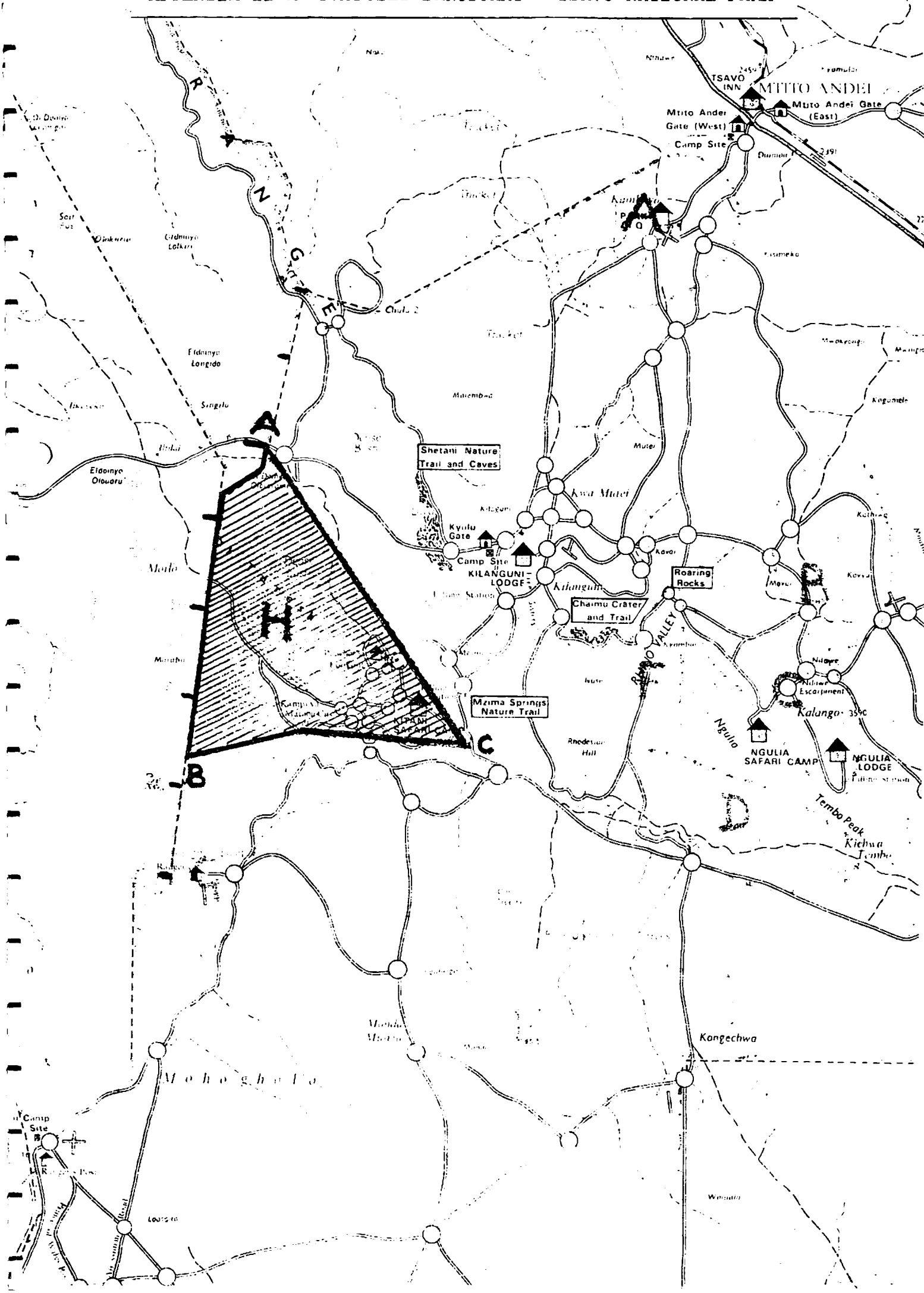
The sanctuary would need its own recurrent allocations.

II.15 Summary

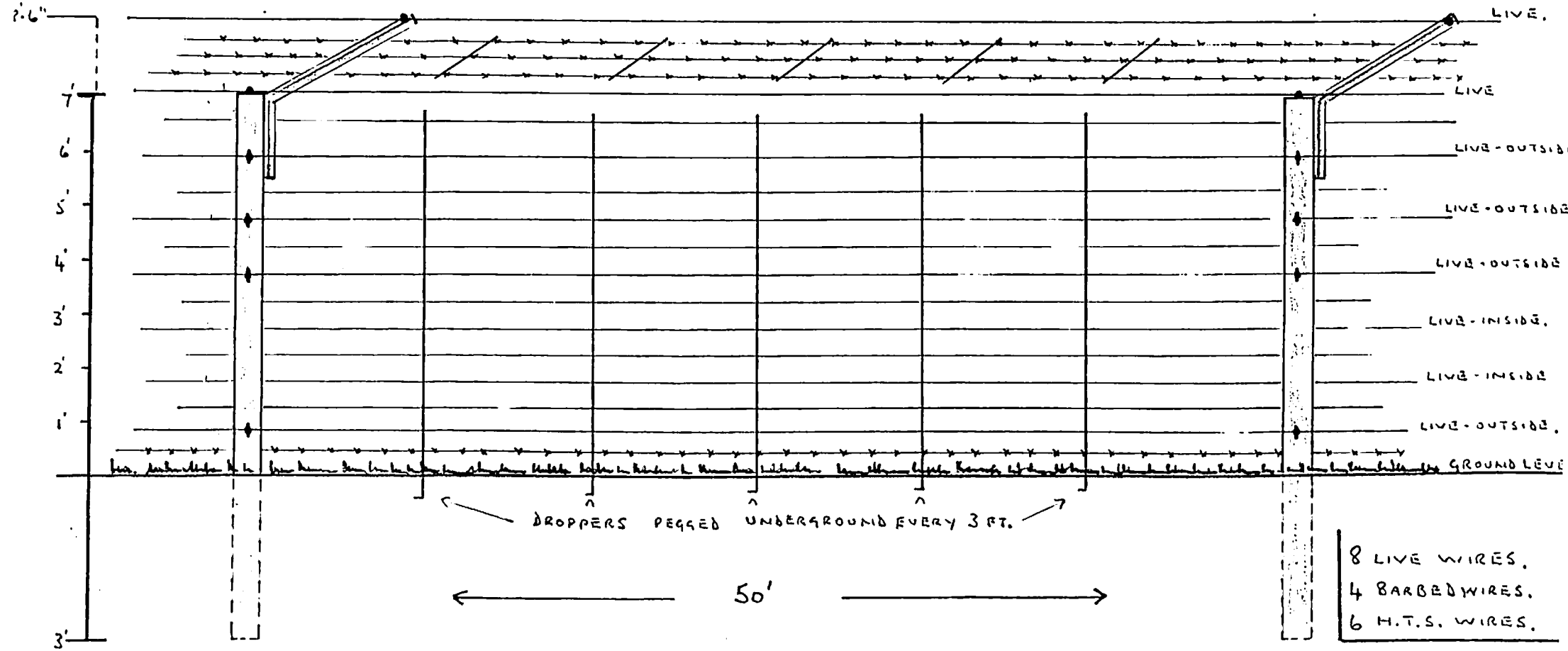
Because of the nature of the terrain and size of the sanctuary this would be an extremely costly venture, and require further detailed surveys.

A fence along the common boundary with the Maasai Reserve could present a number of maintenance problems, from vandalism, and precautions would have to be taken against this.

APPENDIX II A PROPOSED SANCTUARY - TSAVO NATIONAL PARK



APPENDIX II B SUGGESTED CONFIGURATION FOR FENCE



APPENDIX III NAKURU NATIONAL PARK - RHINO SANCTUARY

III.1 Introduction - Background

Records from the early part of this century indicate that rhino were very numerous in the Lake Nakuru and Elementeita areas. They disappeared completely around the mid-1930's with the exception of a few scattered animals in the lower Mau. Two rhino moved into the Park as settlement schemes increased in recent years in the lower Mau. Nakuru now holds a total of 2 rhino (believed 1 male, 1 female).

III.2 Conclusion

Obviously, 2 rhino cannot be expected to establish a new population in Nakuru Park. Either, they must be moved elsewhere - or more rhino must be moved into the Park.

III.3 Proposal

It is believed Nakuru Park could hold a substantial rhino population and that it is ideally suited as a Rhino Sanctuary.

III.4 Rhino Sanctuary

It is suggested that this should be given top priority.

Boundary description - The existing boundary of Nakuru Park.
Total area - approx. 160 km^2 (land area only).

(Appendix III A - Map - Nakuru Park).

III.5 Vegetation

A detailed vegetation survey is required, so that future trends can be monitored.

III.6 Water

There are 3 permanent rivers - the Njoro, Makalia and Enderit. Additional water points should be developed in the South West (Naishi) and Lion Hill areas.

III.7 Fence

With the exception of 6.5 km. the entire Park boundary is now fenced with imported cyclone wire mesh, supported on cedar posts.
Total fence line - 85 km.
(Appendix III B - Present fence configuration).

The present fence will require certain alterations - namely:

i. Most of the present posts need to be more secure.
ii. Additional strainer assemblies are required.
iii. The cyclone wire mesh must be supported by high tensile wire to prevent sagging - which is now evident in some places.
iv. The cyclone wire should be extended approx. 1' underground and be pegged. This would not only be an important deterrent to poachers, but also prevent pigs, leopards etc: getting out into the settlement schemes.
v. Wooden cantilevers supporting barbed wire to give a 45^{o} over hang. (Security purposes).
vi. The entire fence line must be electrified.

(Appendix III C - Suggested "new" configuration).

III.8 Entrance Gate

There are 3 gates to the Park. No additional gates are needed.

III.9 Patrol Base

Fence maintenance camps will be required along the fence line approximately every 10 km. - a total of 8 would be needed.

A patrol base should be established in the South West. Suitable accommodation already exists

III.9 requiring only minor alterations and repairs.

Since the entire Park would be a rhino sanctuary administrative requirements will be the same as they are now; however, additional Rangers will be needed. The Warden would be directly responsible to the National Rhino Committee for rhino management.

III.10 Funding

It is beyond the scope of this paper to submit detailed costings for the necessary alterations and improvements to the existing fence. This will require a detailed survey, which should be carried out at an early date.

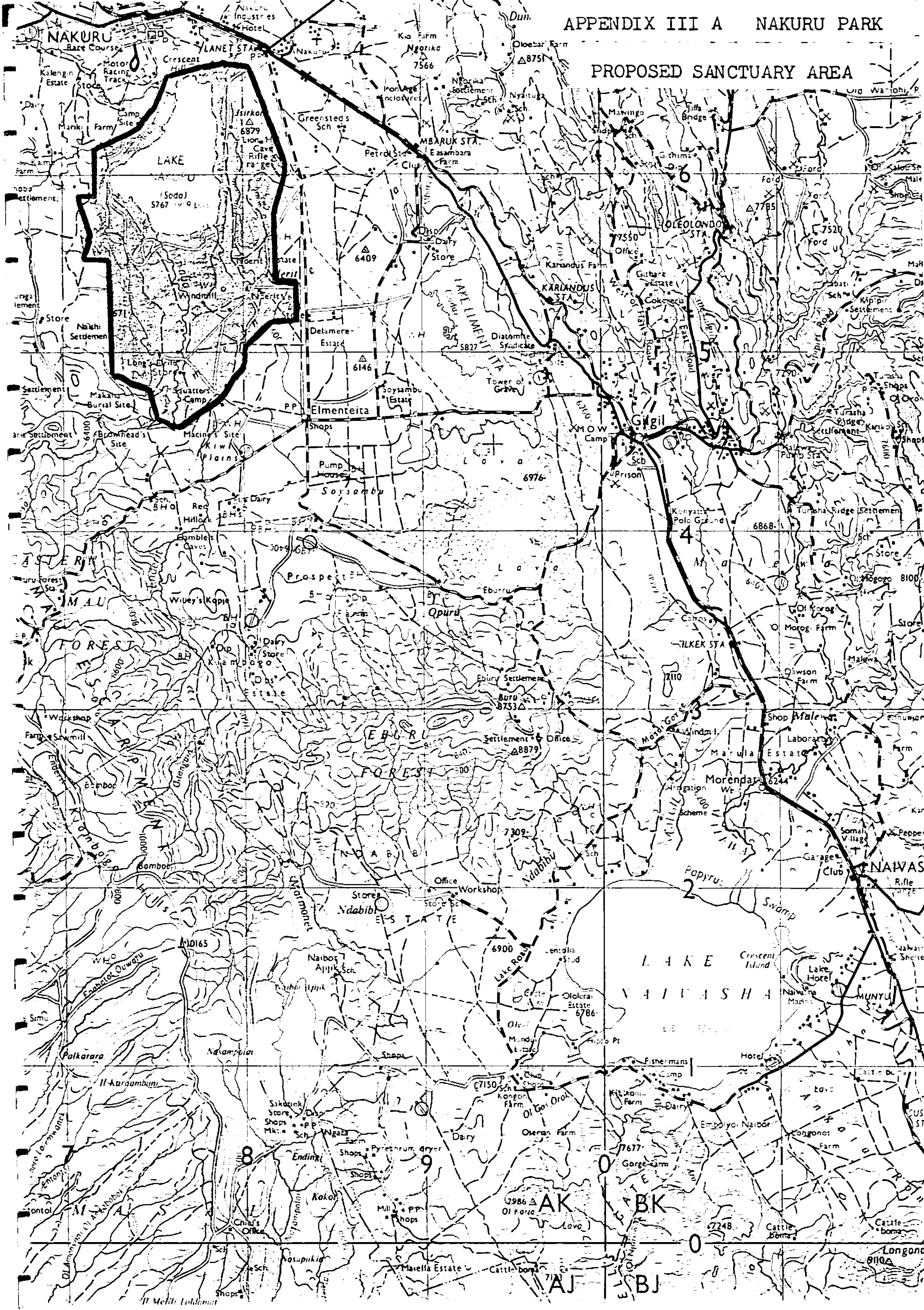
III.11 Summary

Nakuru Park is unique, and is unquestionably one of the most popular and important Parks in the country with over 100,000 tourists visiting it in 1982. The successful establishment of a viable rhino population would greatly enhance its international reputation.

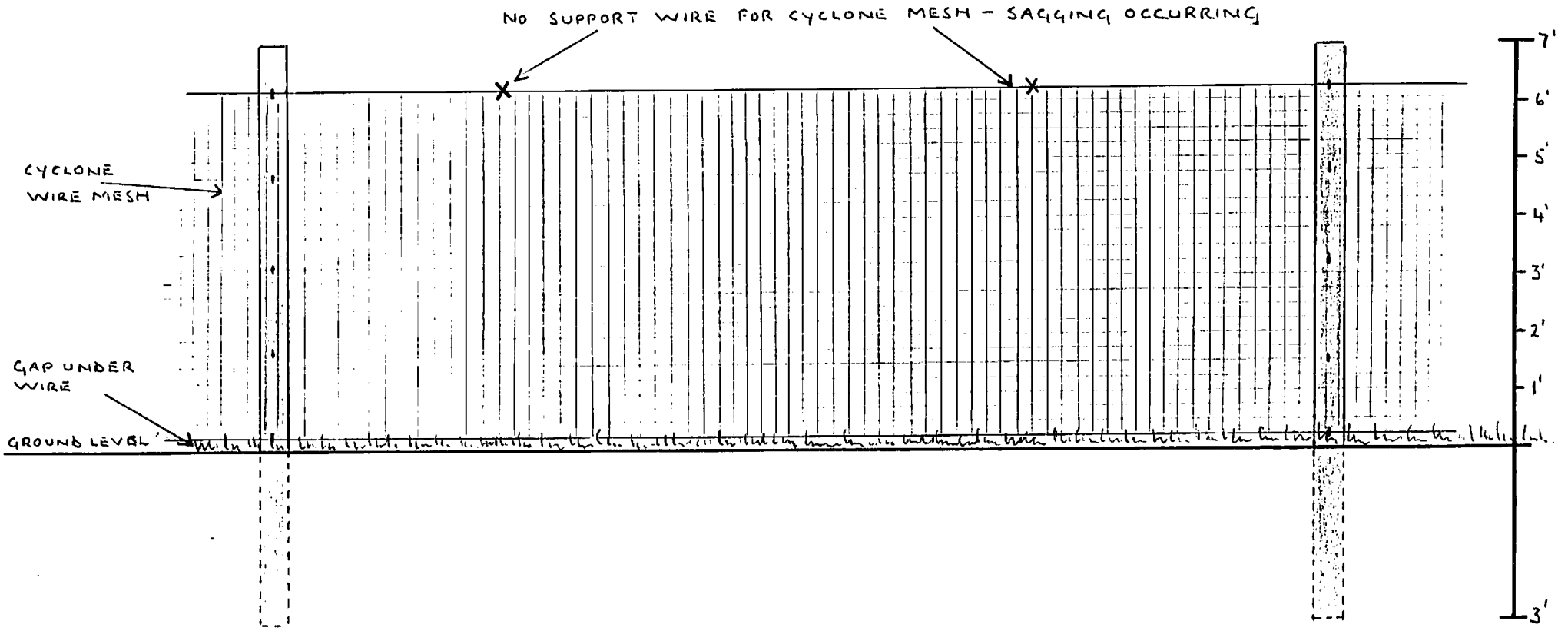
Stocking with certain other wildlife species should also be considered, especially granti and lion.

APPENDIX III A NAKURU PARK

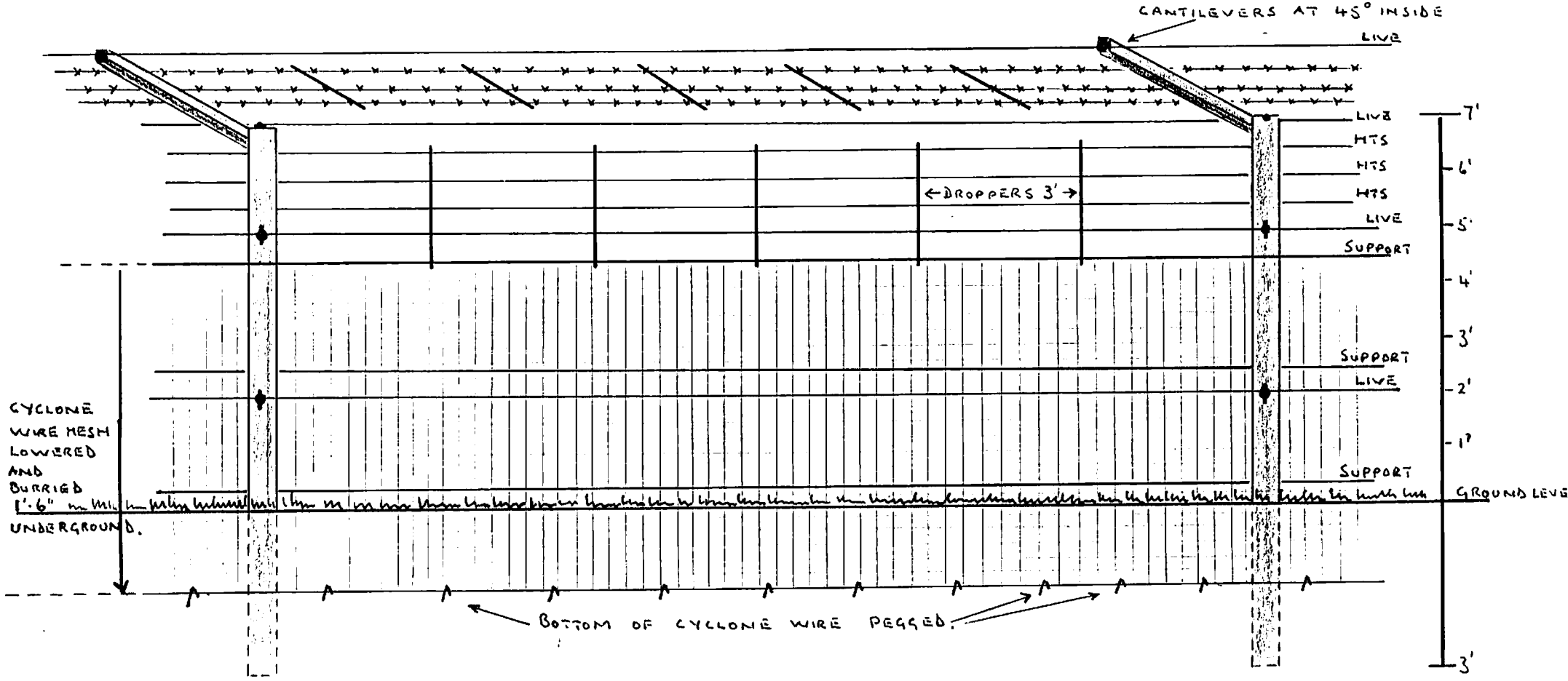
PROPOSED SANCTUARY AREA



APPENDIX III B PRESENT FENCE - NAKURU PARK



APPENDIX III C SUGGESTED NEW CONFIGURATION FOR FENCE
NAKURU PARK



APPENDIX IV ABERDARE NATIONAL PARK - RHINO SANCTUARY

IV.1 Introduction - Background

The Aberdare ecosystem, especially the area known as the "Salient", has always been famous for a very high density of rhino; but, the mountainous terrain, canopy forest and dense undergrowth made it virtually impossible to establish figures of population numbers, with any reliability. However, a former Warden of the Aberdare Park, who had long and extensive experience of the area, considered that the population was in the order of 600 in 1970 (Woodley 1956-'78 pers. comm.)

Rhino poaching was virtually non-existent in the Aberdare Park up to the mid-1970's, but the slaughter which erupted over the whole country about 1975 did not exempt this area. The nature of the terrain made it very difficult - if not impossible - to locate carcases either from the air or by ground patrols and, because of this, the full extent of this killing has never been properly established or appreciated. There is now reason to believe that by the latter part of the 1970's poaching was going on on a large scale. Over the last 5 years not only has there been a very noticeable decline of the numbers of rhino seen in the Salient in particular, but there has also been a marked change in their habits. Whereas before it was a normal occurrence to see anything from 7 - 10 rhino within a few hours drive in the Salient, wandering out in the open glades quite unconcerned, they are now extremely nervous and tend to remain in thick cover. This is a clear indication that the population has been under severe pressure, and recent events have demonstrated that this pressure still continues. There have been a number of cases recently of dogs being seen, and rhino have been killed in recent months.

Furthermore, settlement is increasing and

IV.1 pushing up the mountain slopes, and the former undisturbed status of the whole area is changing. For example - the nightly sightings of bongo at The Ark have declined from a steady 70% over the last 10 years to less than 3% in the last year; this, in itself, is a clear indication that illegal activities in the Park area are rife.

IV.2 Conclusion

The Wildlife Department's 1982 census showed that the Aberdare Park held the last and only viable population of black rhino in Kenya's Parks and Reserves. Even allowing for the fact that the 132 animals revealed by the survey is obviously a minimum figure, there are clear indications that this rhino population is no longer secure.

IV.3 Proposal

i. Permanent patrol out posts must be established.
ii. The fence around the Salient must be improved.
iii. Additional Rangers are needed.
iv. The road system in the Park must be increased and improved.

These proposals are elaborated on under Sections IV.4 - IV.7.

IV.4 Permanent Patrol Outposts

The nature of the terrain in this mountainous area makes it impossible for the standard type of Field Force patrols, which are used elsewhere, to adequately cover a large area.

A number of small permanent patrol outposts must be established in key positions and each outpost should be allocated a defined area of responsibility for closer surveillance. The prolonged wet and cold must be taken into consideration in the design and construction of these outposts. The following locations are recommended for new outposts -

i. Ruhuruini
ii. Githunguri
iii. Amboni

IV.4 iv. Wanderi
v. Wambugu
Existing outposts/gates which require additional personnel are -
vi. Shamata
vii. Wanderi
viii Kiondongoro
ix. Mutubio
x. Rhino
(Appendix IV A - Gates and Proposed Outposts)

IV.5 Fence

The Aberdare National Park Salient is enclosed by a moat. This serves not only as a boundary demarcation but is also to prevent wildlife moving into the highly developed settled areas adjoining the Salient, and to restrict poaching and other illegal activities.

Three years ago an electric fence was erected to supplement the moat which was becoming ineffective.
Length of moat - 42 km.
Length of fence - 21 km.
(Appendix IV B - Salient Fence & Moat).

Some sections of the moat have now deteriorated so badly, due to lack of maintenance, that to all intents and purposes it no longer exists. The electric fence is not effective, as it is badly sited and is the wrong configuration. This fence needs to be completely re-built and the configuration must be drastically improved, if it is to be an effective barrier in the future.

It is recommended that the Loita Wheat Scheme fence, in Narok District, which now serves no useful purpose should be removed and re-erected around the Salient. Chain link mesh should be added and the fence electrified properly. Fence maintenance camps will be needed every 10 km.
(Appendix IV C - Fig.1 Present Loita Wheat Scheme fence
Fig.2 Proposed configuration for Salient)

IV.6 Additional Rangers

The Ranger strength of the Aberdare Park must be increased. It is considered these Rangers should be formed into 2 distinct cadres - as follows:

i. Field Force Rangers

Ruhuruini	5 men
Githunguri	5 "
Amboni	5 "
Wambugu	5 "
Shamata	10 "
Wanderi	6 "
Kiondongoro	6 "
Mutubio	6 "
Rhino	5 "
Park H.Q.	14 "

Total x 72 men

ii. Gate Rangers

Ruhuruini	3 men
Treetops	3 "
Ark	3 "
Wanderi	2 "
Rhino	2 "
Kiondongoro	2 "
Mutubio	2 "

Total x 17 men

IV.7 Roads

The Northern Aberdares must be connected to the Central Aberdares by road from the present Wanderi's road to the Wuthering Heights road, which now ends near Muir's Massif.

IV.8 Funding

The cost of removing the Loita Wheat Scheme fence (23 km) and transporting the materials to Aberdare Park could be met within the Wildlife Department's existing resources. Funds will be necessary for its re-erection and improvement. The existing electric fence could be used to

IV.8 electrify the new fence.

In addition, funds would be needed for -

i. Clearing and levelling the new line, on the inside of the moat.

ii. Fence maintenance camps.

iii. Additional Outposts.

iv. Road to link Central Aberdares to Northern Aberdares.

IV.9 Summary

Unless management practices are overhauled and improved the rhino in the Aberdare Park could quickly be in serious trouble, as has happened elsewhere.

APPENDIX IV C

FIG. 1.

LOITA WHEAT SCHEME

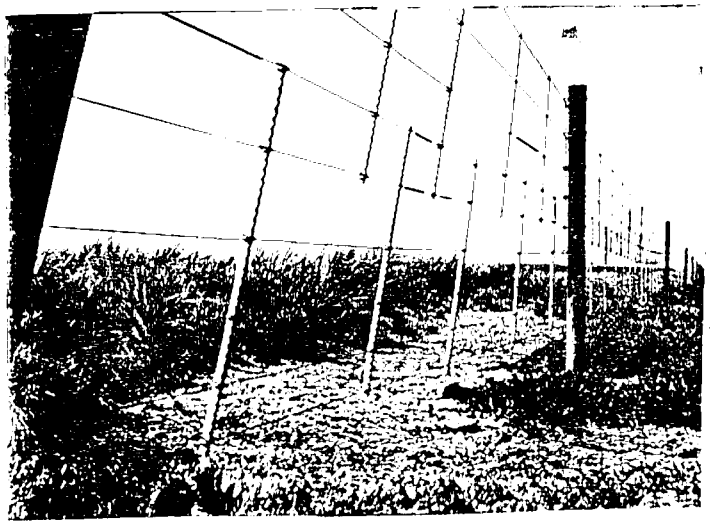
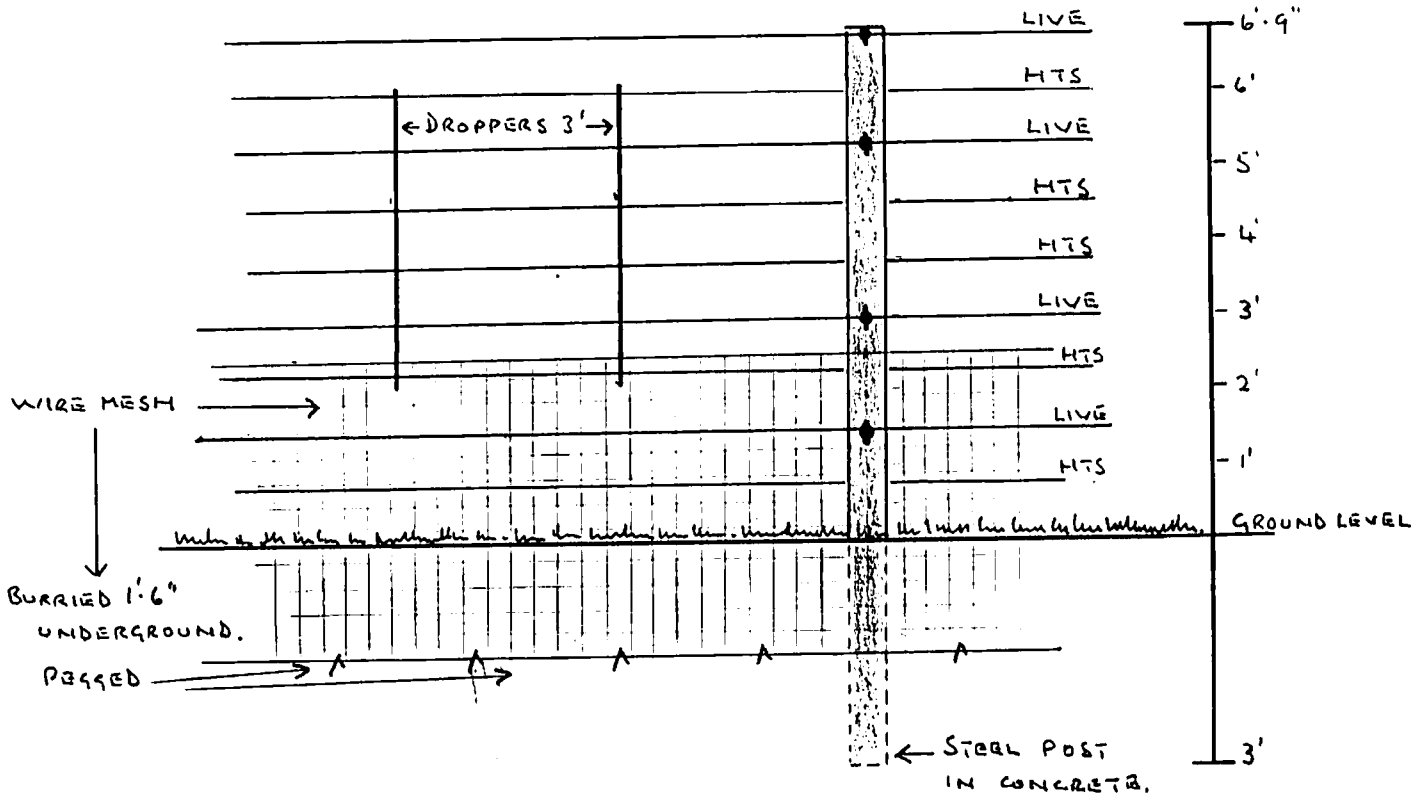
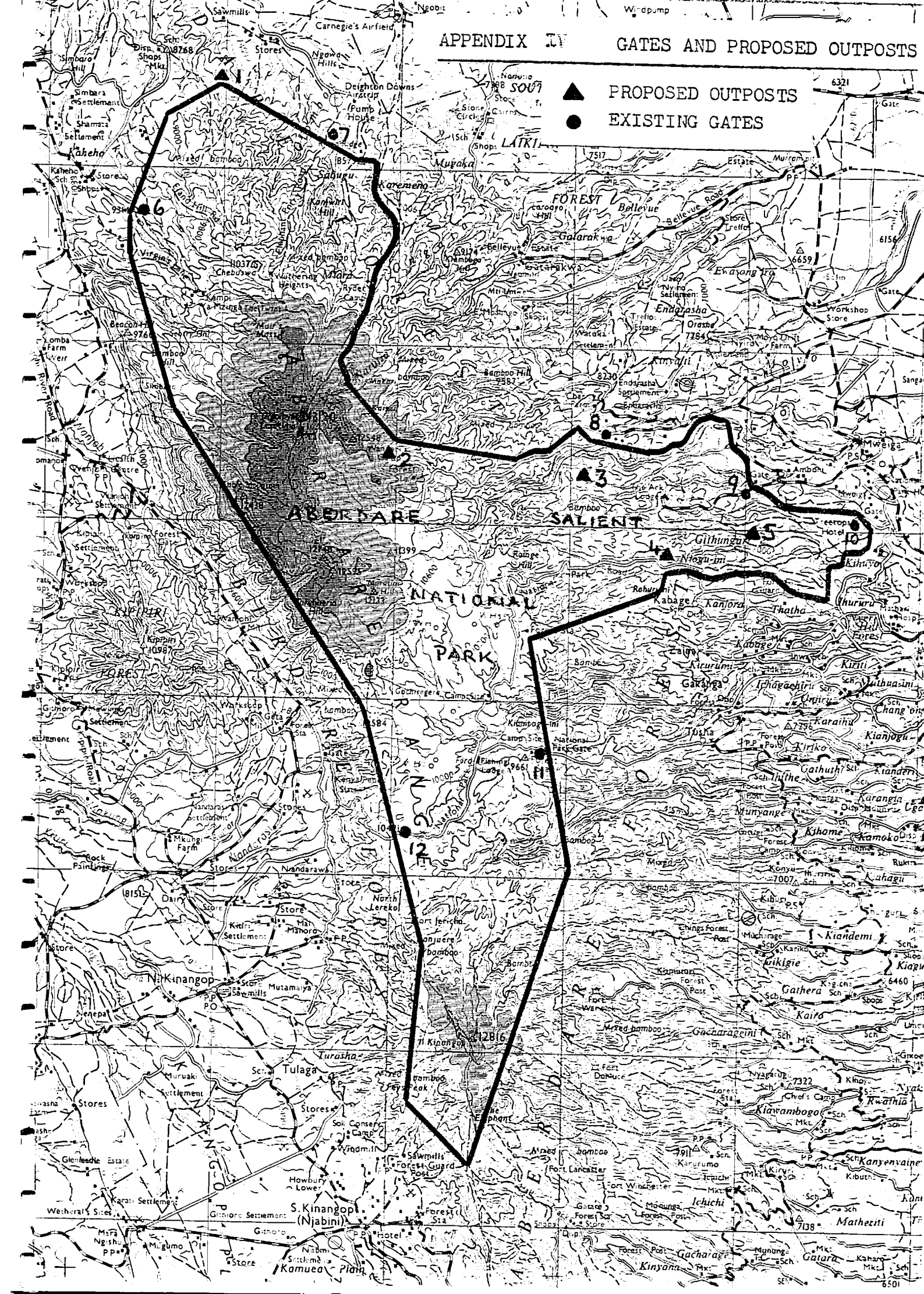


FIG. 2.

PROPOSED CONFIGURATION FOR SALIENT.



APPENDIX IV GATES AND PROPOSED OUTPOSTS



APPENDIX V MAASAI MARA NATIONAL RESERVE - RHINO SANCTUARY

V.1 Introduction - Background

The Southern Maasai District, which includes what is now the Maasai National Reserve, used to contain a significant population of rhino. They were found in pockets throughout the district, especially in the dense thickets which occurred on the high ground and along the numerous water courses.

There is very little reliable information available on even approximate numbers, however, the Game Warden for Maasai District reported in his 1954/55 annual report that rhino appeared to be on the increase. Dr. Fraser Darling carried out a wildlife survey in 1958 of a small area covering the Mara plains, Sand river, Keekorok and lower Talek areas, and estimated that population to be in excess of 100. Allowing for the fact that his survey was a ground count, and did not include the hilly country to the east and north, the overall population for the whole Southern Maasai was very probably at least 500 in the 1950-60's. The extent of the rhino poaching in this area has not been clearly documentated, but the scale of the decline is demonstrated by the fact that only 28 animals are now known to exist in the Maasai Mara Reserve and the periphery areas. Most of these are widely dispersed.

Furthermore, the dense thickets on the hills and in the valleys, where the majority of the rhino were found in the past is now receding rapidly. This ecological change has been brought about by an influx of elephant within the last 20 years, enabling fires to further inroad the thickets which has caused a decline in tsetse fly, and opened up the area for livestock.

V.2 Conclusion

Most of the remaining rhino are widely dispersed and the continuing deterioration of suitable cover and rhino habitat will probably accelerate the dispersal and decline of the population. In its present state, this is not a viable population, and even with the "daily surveillance" now being carried out by the Wildlife Department of the remaining animals, it is very uncertain if this population could ever build up and re-establish itself again properly. They 'may' be able to maintain their numbers for a period, but it is considered that, in the long term, the decline will continue.

V.3 Proposal

The remaining rhino should be translocated.

V.4 Rhino Sanctuary

A number of restraining factors had to be considered when examining the feasibility of a rhino sanctuary in the Maasai Mara area:

i. A deterioration of suitable rhino habitat everywhere.
ii. An area which would not conflict with the annual migration of wildebeeste and zebra.
iii. The land status and future requirements.
iv. Opposition to a fenced sanctuary by the Local Authority, who are responsible for the administration of the Maasai Mara Reserve.

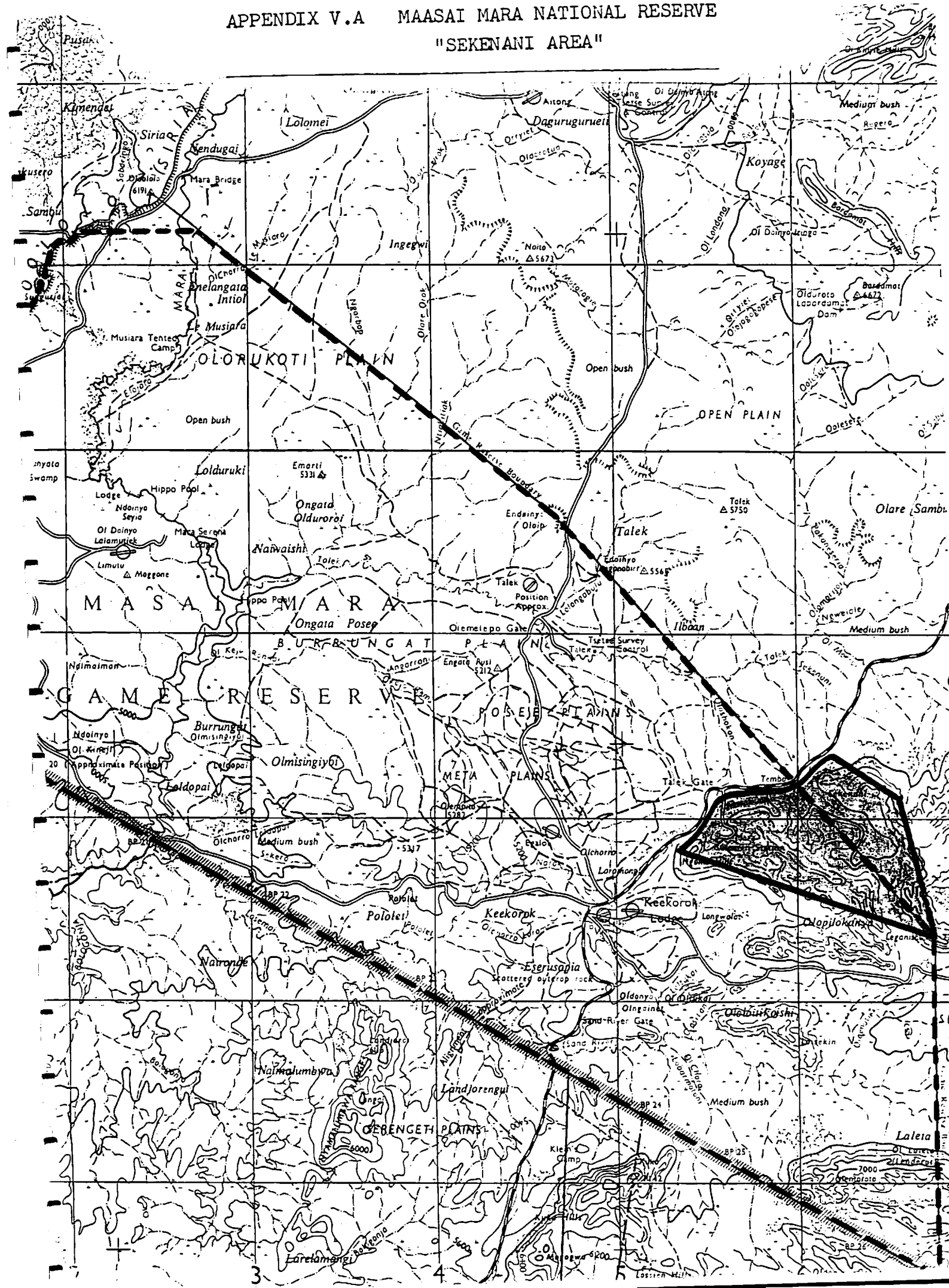
Leaving aside (iii) and (iv) for the moment, (i) and (ii) place serious restrictions on the selection of a suitable area. With this in mind, the only suitable location for a rhino sanctuary is east of the new community centre in the Sekenani Valley, including the high ground on both sides to Siana Hill. Much of this is outside the present Reserve boundary and involves the land status (iii) and (iv) and further complicates the whole issue.
(Appendix V. A Maasai Mara National Reserve - Sekenani Area)

V.5 Summary

Unless the objectives under (iv) can be overcome and the land acquired in the Sekenani valley and the hills to the east, the project is not feasible.

Obviously, it would be very desirable to establish a rhino population in the Maasai Mara area, but if all the factors which have been outlined are taken into account, and cannot be resolved, it is believed that, in the long term interest of the remaining rhino, consideration might have to be given to translocating them elsewhere.

APPENDIX V.A MAASAI MARA NATIONAL RESERVE
"SEKENANI AREA"



APPENDIX VI BOGORIA NATIONAL RESERVE - RHINO SANCTUARY

VI.1 Introduction - Background

Records from the early part of this century indicate that black rhino were plentiful right through the Rift Valley from Nakuru to Lake Bogoria (then Lake Hannington) to Lake Baringo and the upper Suguta valley. Percival (1902) recorded that they were more numerous in the Baringo District than anywhere else in the country.

There are none in this area to-day.

Bogoria National Reserve is 107 km^2 with a land surface area of approximately 73 km^2. The east side of the Lake, under the Siracho escarpment, contains ideal rhino habitat but is limited in area as the escarpment, which is part of the eastern Rift wall, rises abruptly to over 2000' above the Lake shore; much of it is near vertical cliff face, thereby reducing the useable area.

VI.2 Conclusion

The heavy lava and the sheer cliffs on the east side would make this area extremely difficult to enclose by fencing, and although the habitat is well suited to rhino it only covers a limited area.

It is considered that any form of rhino management in this area would be impracticable.

APPENDIX VII OTHER RHINO AREAS

VII.1 Nairobi National Park (117 km^2)

At the beginning of the century rhino were plentiful in the Nairobi area. Colonel Meinertzhagen records in his diary (18th May 1902) counting 5 from the train between Athi River Station and Nairobi - a distance of 16 miles. With expanding development spreading out from Nairobi in the 1920's - 1930's, followed by the war - 1939-1945 - wildlife in the surrounding areas receded. When the Nairobi National Park was gazetted in 1946 there were no resident rhino in the new Park, the nearest population was in the Kitengela area to the south. Very occasionally the odd rhino passed through the Mbagathi forest at night, but it was not until the late 1950's that, slowly, a few began to move back into the Park and settle down permanently; by the early 1960's it was thought at least 6 had established themselves inside the Park.

During 1963-1964 12 rhino were translocated from threatened areas into the Nairobi Park. Of these, one died and 2 moved out to the south (Kitengela). Between 1966-1968 a further 22 were translocated into the Park, of which 2 died and 2 moved out. A detailed survey carried out 33 months after the last release identified that 18 of the translocated rhino were still in the Park (Hamilton & King 1969). From the translocation exercises, and the known 6 which had established themselves earlier, the population by 1970 stood at 33. In theory, by 1983, the population should be over 40 -
the reported numbers are, in fact, 21. (Warden, Nairobi Park pers. comm. 1983).

This would indicate that, either -

a) there has been a decline - or
b) there has been a movement out of the Park.

VII.1 With rapidly increasing development south of the Park, it is difficult to imagine that any of those that may have moved out still exist.

The purpose of outlining this in detail is, that it would appear some useful lessons can be learnt; namely -

1. Too many were probably translocated into this small area in the first place.
2. If rhino are moved to a new environment which is not fenced some will move out of the planned area; as the recent experience in Amboseli demonstrates.
3. Close monitoring of released animals is vital.

The Nairobi Park in its entirety should be considered as a rhino sanctuary. However, with the increasing settlement and development of all types now rapidly surrounding this small Park, long term management planning will have to be considered in the near future. In the final analysis, it is probable the Park will have to be completely fenced. This brings in the question of either a total enclosure, or defining and maintaining adequate corridors for the migratory species which come into the Park from the south at certain times of the year.

VII.2 <u>Marsabit National Reserve</u> (2020 km.^{2} total - forest area 142 km.^{2})

Up to about 15-20 years ago rhino were still reasonably plentiful throughout most of the Marsabit National Reserve, but since then they have declined rapidly. This decline has been brought about by not only poaching, but within the last 10 years a rapid increase in cultivation right up to the forest edge, and the few remaining animals are now confined to the relatively small forest area. This forest is a dense canopy in broken terrain, making any sort of reliable figures of the remaining

VII.2 numbers virtually impossible to obtain, but it is probably very low.

The few remaining rhino "might" be able to maintain themselves for a period, if they are not interfered with, and it is recommended that patrol surveillance should be stepped up. However, due to the remoteness of Marsabit and the continuing uncertainty of the future status of the forested area, it is considered that any rhino sanctuary project here would be impracticable.

VII.3 Amboseli National Park (392 km.^{2})

At the end of the last war Amboseli was the most famous area in East Africa for rhino. There are no reliable figures of the population at that time, but when the area was gazetted as a National Reserve in 1948 various records indicate that it was in the order of 150. The majority of the population was concentrated in a small area around Ol 'Tukai and there are a number of records of sightings of 15 - 20 different rhino in an afternoon. (Kenya National Parks' reports 1948-'58).

The last 20 years has seen major ecological changes and a large proportion of the woodland has died out. This may have been a small contributory factor to the decline of the rhino, but the most significant one was poaching, which effected all rhino areas at about the same time. By 1978 the population was down to 8, but has now built up to 17 (Western pers. comm.).

Inspite of this increase, because of the size of the area, increasing land pressure and ecological changes it is unlikely that rhino could ever build up to significant numbers again. Inbreeding can be expected, and the introduction of new stocks into a "loose" population can pose problems - as recent experience has shown. For the long term, it 'might be' in the best interests of the rhino to translocate them elsewhere.

VII.4 Other areas

The Wildlife Department census in early 1982 revealed a few rhino still remaining in the following areas:

North Tharaka	1	Recent reports confirm it is still there. (Oct. 1983)
Narok District	13	excluding the known 28 in Maasai Mara (Provincial Senior Warden pers. comm.)
Eldama Ravine	2	
Londiani Forest	1	
Kiplombe Crater	4	(Provincial Biologist Rift reports only 1 remains. October 1983)
Rimoi area	3	
Yatta area	2	
Embu area	1	
Wamba area	3	
Laikipia area	3	Tomlinson's farm (private land)
	2	Mugi estate (" ") (owners' reports)
Mweiga area	2	Sangare estate (" ") (owner's report)
Timau area	4	Embori (1 killed Sept. '83 possible 3 left) (Informer's report)
Nanyuki area	2	Gathiuru (Informer)
	5	Ol Jogi Ranch (1 male 2 females with calves) in a totally fenced private game reserve of approx. 7000 acres. (Owners' report).
Siracho escarpment	1	last report received 3 months ago (Warden Bogoria pers. comm. Sept. 1983)
Ngeng valley	28	(Senior Warden Operations Oct. 1983)
Shaba area	1	(Informer Nov. 1983)
Nguruman escarpment		It is known some still exist but no information is available of the numbers.