

SHELLFISH UTILIZATION AND ITS
EFFECT ON ROCKY SHORE BIOTA
IN TRANSKEI

by

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A thesis submitted in partial fulfilment
of a Master of Science degree in the
School of Environmental Studies,
University of Cape Town.

February 1985

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ABSTRACT

The shellfish on the rocky shores along the Transkei coast experience intense exploitation from three different sources viz. commercial exploitation, tourist - induced exploitation and continued regular harvesting by the indigenous people. The question raised as a result of these combined factors has been whether or not the rocky shore ecosystem can maintain its balance in the light of the pressure currently been exerted on it. This study sought to investigate all aspects of the shellfish utilization, as well as the effects of this exploitation through a comparison of protected and exploited rocky shore sites.

Questionnaire and interview techniques were the primary method used to assess shellfish utilization. These techniques were backed by personal observations and limited collection and analysis of meal remains. The physical sampling of sites by scraping areas in each zone of the rocky shore, followed by the analysis of the samples in the laboratory constituted the main method used to obtain biological data. A photogrammetric technique was also used.

The results indicate that the effects of exploitation are most obvious in the Perna-Coralline algal turf zone, where the exploitation pressure is also the greatest. Perna perna communities in particular are affected. Exploited sites maintain young populations of P. perna with an average size of less than 4cm (Means of 2.95cm and 2.26cm were obtained). The protected sites on the other hand exhibit more stable mature communities of P. perna (means of 5.91cm and 4.70cm were obtained).

An increase in the percentage cover of coralline algal turf and a corresponding decrease in the percentage cover of P. perna was recorded with increasing exploitation. Species composition appeared slightly limited in the Perna-Coralline algal turf zone

The average size of Crassostrea cucullata is reduced at exploited sites, (on the basis of percentage cover measurements). Exploitation could not be shown to be having any definite discernable effects on the limpet populations in all zones, nor on the variation in species present or absent in the balanoid and crassostrea zones.

The general population structure of mussels at exploited sites has not changed significantly over the last six years, indicating that a delicate balance is being maintained. However, where commercial pressure is greatest, as in the vicinity of hotels, this balance is destroyed and the mussel community is largely replaced by coralline algal turf (the percentage cover of algal turf at Coffee Bay in the Perna-Coralline algal turf zone was approx. 91.5%).

The existing legislation, manpower availability and present control measures pertaining to shellfish utilization are discussed, and general conservation recommendations are made based on the findings of this study.

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ACKNOWLEDGEMENTS

The following people are acknowledged with thanks for their assistance in the study:

Professor John Grindley for his supervision and encouragement throughout the study.

Professor Arthur and Doctor Theresa Dye for their guidance, criticism and assistance throughout the study.

Professor Prinsloo and the staff of the Zoology Department of the University of Transkei for allowing me the use of excellent laboratory facilities and their friendly acceptance and encouragement throughout the study.

Professor George Branch for commenting on the results.

Mr W. Qaba and staff of the Division of Nature Conservation, Transkei, for their willing co-operation and interest in the study.

Dr H. Livingston of the Department of Health, Transkei, for granting permission to involve the coastal clinic nursing sisters.

To all the nursing sisters who patiently and diligently administered the food utilization questionnaires.

Miss Barbara Byron for assisting with the identification of specimens.

Mr and Mrs J. Van Niekerk for the accommodation they provided

so willingly in Umtata and at Hole in The Wall, and for the wealth of background information they provided.

Mr N. Eayrs of the Cottage Owners Association for his co-operation and background information provided.

My colleague, Collette Van Wyk, and Frank Black for the hours of work, assisting with length-mass regressions and to Collette for her general encouragement and useful comments.

Mr Charlie Kuntzman for his editing of the draft manuscripts.

Bernadette Van Leeuwen for typing the manuscripts.

The CSIR for awarding a post-graduate bursary for two and a half years.

The South African Nature Foundation for their generous grant towards the project.

To my parents a special thanks for their generous support throughout my university career.

I am deeply indebted to my parents-in-law, Dr and Mrs E. Mills, without whose practical assistance, generosity and encouragement this thesis would not have been written.

My husband, Mark, for his love, patience and encouragement at all times.

To God, my heavenly Father, I give all praise and glory for His wonderful creation and the incredible wisdom that is revealed through the functioning of His ecosystems.

CHAPTER ONE - INTRODUCTION

1.1 The Nature of The Problem

Excavation of a shell midden at Mpame, on the Transkei Coast, has revealed that early iron age groups, as far back as the seventh century, A.D., have "indulged in intermittent but regular shell collecting based on a tidal cycle and primarily aimed at the harvesting of the *Perna perna* mussel" (Cronin, 1982).

Coastal dwellers in the Transkei today maintain this age-old tradition of shellfood harvesting. There is, however, a major factor affecting the harvesting of shellfood today as opposed to generations ago - this is the tourist-orientated commercialization of the coastal area, as well as the direct exploitation of the rocky shore by commercial companies for profit.

The tourist trade has had both a direct and an indirect effect on the rocky shore biota. The physical removal of certain species of shellfish from the rocks has added pressure to an already delicate ecosystem. Previous surveys have recommended a strict control of this exploitation (Anon., 1977a).

A more subtle indirect effect of tourism has been the increasing awareness by the indigenous people of the commercial value of their marine resource (Avery and Siegfried, 1980). This awareness may have an influence

on the harvesting activities of the local people, in that now both food and/or income could be the goal of the harvester.

These combined factors, viz. commercial exploitation, tourist-induced exploitation, and the continued, regular harvesting of shellfood by the indigenous people, raise the question of whether the rocky-shore ecosystem can maintain its balance in the light of the pressure currently being exerted on it.

A further important factor on the Transkei coast is that it falls within a transition zone between sub tropical East coast species and warm temperate South coast species (Stephenson and Stephenson, 1972). This transition is most marked between Port St Johns and Qolora, and particularly affects the fauna of the area. Port St Johns has a much greater number of species belonging to the sub tropical East coast component than Qolora (Stephenson and Stephenson, 1972). This implies that certain of the species occurring in this region are reaching the limits of their distribution, which may make this stretch of coast more vulnerable to the effects of exploitation.

Research in the field of rocky-shore ecology has tended to concentrate on specific physical and biological parameters influencing the development of the community structure of the rocky-shore biota, while little attention has been given to the effect of human interference on the ecosystem.

On the Transkei coast the need for such research is becoming increasingly urgent due to the increasing human pressure on the rocky-shore biotic communities.

1.2 Aims and Objective

This study was developed with three basic aims in mind:

- (i) to investigate the utilization of the rocky-shore biota by (a) the indigenous people, (b) the visitors to the coast, and (c) the commercial companies;
- (ii) to determine the effect of this exploitation on the rocky-shore biota; and
- (iii) to examine existing conservation legislation and problems with its enforcement.

The primary objective of this study is to provide information to assist in the proposal of practical conservation measures that would be acceptable to the indigenous people of the Transkei coastal area.

1.3 Study Areas

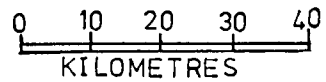
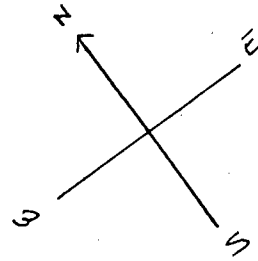
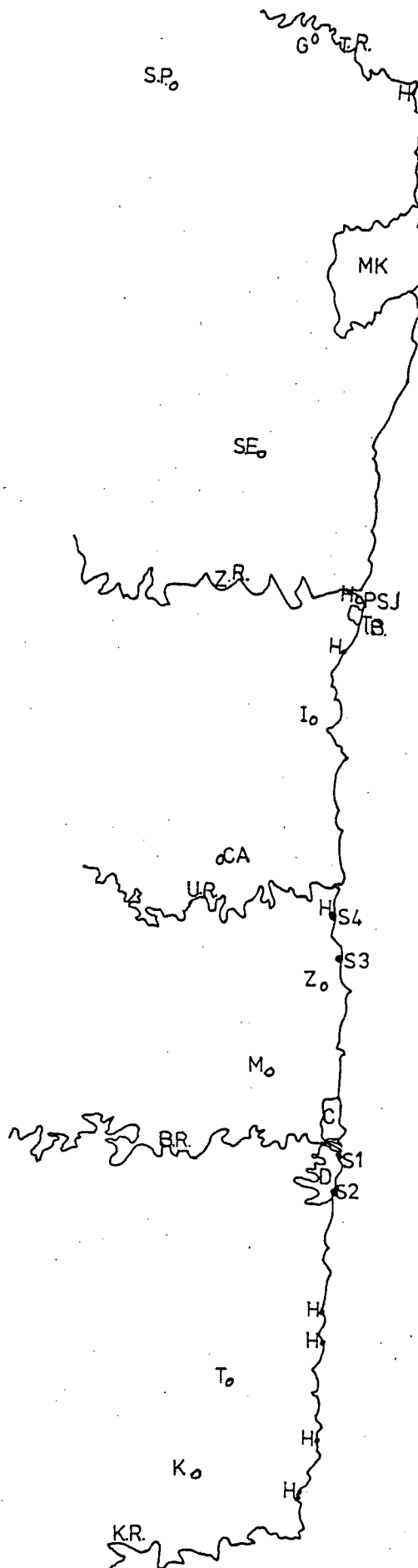
Field work on the rock shore was carried out at four sites along the Transkei coast. Each site was selected according to the amount and type of exploitation occurring.

The sites represent four different degrees of exploitation:

- Site 1 : No exploitation - Mendwana
- Site 2 : Limited exploitation - Dwesa Nature Reserve
- Site 3 : Tourist induced, and also
regular local harvesting - Hole in The Wall
- Site 4 : Tourist induced (hotel
and camps), and regular
local harvesting - Coffee Bay

Investigation into the utilization of the rocky-shore biota, by the indigenous people and the coastal visitors, was conducted at various points along the entire coast (see Figure 1).

FIG.1: MAP OF THE TRANSKEI COAST



KEY:

S1	SITE 1- MENDWANA
S2	SITE 2- DWESA
S3	SITE 3- HOLE IN THE WALL
S4	SITE 4- COFFEE BAY
D	DWESA NATURE RESERVE
C	CWEBE NATURE RESERVE
MK	MKAMBATI N.RESERVE
TB	THIRD BEACH N.RESERVE
RR	MBASHE RIVER
KR	GREAT KEI RIVER
TR	MTAMVUNA RIVER
UR	MTATA RIVER
ZR	MZIMVUBU RIVER
CA	CANZIBE HOSPITAL
G	GREENVILLE HOSPITAL
I	ISILIMELA HOSPITAL
K	KENTANI
M	MADWALENI HOSPITAL
PSJ	PORT St. JOHNS
SE	St. ELIZABETHS HOSPITAL
SP	St. PATRICKS HOSPITAL
T	TAFALOFFEE HOSPITAL
Z	ZITHULELE HOSPITAL
H	HOTEL

CHAPTER TWO - HUMAN UTILIZATION OF
ROCKY SHORE BIOTA

2.1 Introduction

Archaeological evidence, from various middens along the Transkei coast suggests that "shellfood collecting and the exploitation of coastal food resources has been an activity of a variety of groups of hunters, herders and farmers over at least the last millennium and probably far further into pre-history" (Derricourt, 1977, p.136). This conclusion was substantiated by M. Cronin (1982) by the dating of specimens from the Mpame midden which brought the earliest date to the seventh century A.D.

Moreover, the evidence suggests that the full range of available species was exploited by these early groups, the dominant species found in middens being the brown mussel, *Perna perna*. In fact, a fairly high correlation between species present in archaeological middens, and species collected by local tribespeople today, has been found (Derricourt, 1977).

The history of the use of the coast by tourists is much more recent, going back to approximately only the last hundred years. From the beginning, however, the tourist/coastal visitors have bought shellfood from the local tribespeople.

For the purposes of this report, a tourist is defined as any person who visits the coast but does not reside

there permanently. Thus, the definition incorporates visitors to the coast who are both residents (and who may own coastal cottages), and non-residents of Transkei; and the word shellfish includes red bait, crayfish and barnacles.

The tourist facilities offered today on the Transkei coast include the following:

12 hotels, 3 of which are situated in Port St. Johns, 2 at Coffee Bay, and 2 (Seagulls and Trennery's) in the vicinity of the Qolora River. The largest, and most recent hotel on the coast is the Wild Coast Holiday Inn and Casino, built after independence in 1976, at Mzamba.

Three holdiaiy resorts offering self-contained cottages: these are all situated in Port St. Johns.

Four nature reserves - Dwesa. Hluleka, Mkambati, and Third Beach, Port St. Johns. Dwesa offers both bungalow accommodation as well as camping facilities. Hluleka offers only bungalow accommodation at present. Mkambati, although government-owned, is run privately and offers safaris, hunting and game viewing. Chalets are planned for Third Beach, but are not available at present.

Ten "official" camping sites along the coast, of

which all but three offer no ablution facilities at all. One requires a permit, obtainable from The Division of Nature Conservation, to camp along the Wild Coast.

Two official hiking trails are open at present, and a third is in the planning stage. Overnight huts have been provided on these trails.

In addition, there are approximately three hundred and fifty privately-owned cottages on the coast. In order to own a cottage on the Wild Coast, a person must be a resident of Transkei. These cottages may not be hired out for profit.

The most extensive and detailed research into the current use of shellfish by the indigenous coastal Transkeians has been the work of E. H. Bigalke (1973). In his report, which incorporates data collected over a three-year period from 1969 to 1972, he covers details such as the collecting process, methods used, and the species collected. The present study expands on most of the work done by Bigalke, using a different method of data collection.

Although the effect of tourism on the rocky-shore biota has been commented on in the majority of reports (Bigalke, 1973, Anon., 1977a, Siegfried (Ed.) 1977, Avery and Siegfried, 1980), no research into this aspect has yet been done on the Transkei coast. The

present study includes this aspect, as well as providing information on commercial exploitation, thus forming a holistic picture of all aspects of the human utilization of rocky-shore biota on the Transkei coast.

2.2 Methods

2.2.1 Utilization of Shellfish by Indigenous Coastal Transkeians

A 'food utilization questionnaire' was constructed to ascertain the role of shellfish in the diet and the economy of the indigenous Transkeians.

The questionnaire (see Appendix One), was divided into three major sections relating to crop production and utilization, livestock utilization, and rock food utilization. The sections on crop production and livestock utilization were included for two reasons:

- (i) to supply information regarding other aspects of the coastal peoples' diet; and
- (ii) to distract the subjects' specific attention from the section on shellfish utilization.

The questionnaire was translated into Xhosa by two independent translators. The two translations differed slightly, and to overcome this

problem a third person was asked to translate the questionnaire from Xhosa into English. The most suitable translation was then selected.

In order to overcome the natural suspicion and mistrust of the coastal people toward a "foreign white interviewer", it was decided that Xhosa people with whom the locals were more familiar should be used as interviewers.

Coastal clinic nursing sisters were selected, as they are well educated and in most cases are trilingual. They have experience in questionnaire administration, and the local people are accustomed to answering questions put to them by the nursing sisters.

The Director of Medical Services agreed to give the necessary authorization, but suggested that the questionnaire be scanned by the Health, Education and Nutrition Divisions of the Transkei Department of Health. These authorities have experience with questionnaire construction and administration, geared toward rural people. All groups concerned approved the form and wording of the questions in each section of the questionnaire.

A list of the hospitals serving the coast was made available by the Director of Medical Services.

A trial run on the questionnaire was conducted at Hole in The Wall. In this case the local teacher was asked to administer the questionnaire. Problems were discussed, which led to the inclusion of a detailed set of instructions to the interviewer (Appendix One).

Each hospital was then visited. The project and the questionnaire was discussed with the Matron-in-charge of community services, or the Sister in charge of the clinic. Where possible, the person who was to administer the questionnaire, was given the instructions. However, in many cases it was not possible to speak directly to those administering the questionnaire. In these cases, the importance of the instructions pertaining to the questionnaire was stressed. The impossibility of discussing the questionnaire with the administrators is a major drawback of this method and may account for the fairly large percentage of incorrectly completed forms.

A total of thirteen clinics and hospitals was involved in the survey, effectively sampling the coast from Greenville in the north to the Kentani district in the south.

Three hundred and forty questionnaires were distributed.

One hundred and twenty-eight were correctly completed, i.e. thirty-eight percent. One hundred and twenty were not returned or completed, and ninety-two were incorrectly completed.

An entire week of August, 1983, during the spring-tide period, was spent at Hole in The Wall. The purpose of this was to observe harvesting practices and to talk to the local people regarding shellfish utilization. An attempt was made to ascertain the numbers taken and which species were harvested. An interpreter, a young boy, was found from the local community. Women were asked to bring the researcher all the shells once they had finished with them. Four women responded, and brought the empty shells from the previous day's harvest. The shells were then identified, counted and measured.

An attempt was made in June 1984 to repeat the above procedure but, although a number of women were asked to co-operate, none of them in fact did. In this instance there were a number of other whites at Hole in The Wall effectively providing a ready market for part of the harvest, and it was not possible to use an interpreter from the local community, therefore, a white interpreter was used. These two factors may

account for the lack of response. In future research of this nature, it is strongly recommended that the researcher work from within the community.

In order to establish whether harvesting practices and/or patterns had changed over the years a questionnaire (see Appendix One) was sent to selected white cottage owners.

Cottage owners on the Transkei coast, in general, take a keen interest in the local indigenous people. The cottage owners selected were those who had owned cottages on the coast for at least ten years. They visit the coast regularly, and have observed the harvesting activities of the local inhabitants for many years. Two cottage owners from each resort were sent questionnaires. In total, twenty-eight forms were sent out by post, and fourteen were returned. The names and addresses were obtained from government records. These records are known to be inaccurate, but are the only ones available. The number of forms returned may therefore have been reduced by possible weaknesses in the postal service. For example, one cottage owner was found to have died some years previously, and another cottage had been sold some time ago. These changes had not been included in the records.

2.2.2. The Economic Aspect

The sale, and thus purchase, of shellfish on the Transkei coast is prohibited in terms of Section 13 of the Sea Fisheries Act, 58 of 1973. Information regarding the purchase of shellfish is, therefore, difficult to obtain.

In order to establish to some extent the amount of shellfish being purchased by the coastal hotels, the hotel managers were asked to record purchase information under a promise of strict confidentiality. A directive from the Managing Director of the Transkei Development Corporation, in favour of the project and authorising the release of information, was obtained and given to each hotel manager. The hotel manager was asked to record the following information at each purchase, for each species purchased:

- (i) date of purchase;
- (ii) quantity purchased - they were required to determine the 'wet weight' of the animals before cooking; and to collect the used shells and place them in the containers provided instead of discarding them;
- (iii) the number and sex of the local people involved in the sale. A part of the

questionnaire asked whether these persons were specifically asked by the hotel to collect, or whether the shellfish was voluntarily offered for sale; and

- (iv) the amount of money paid for the shellfish.

Each manager was provided with a pre-marked recording booklet, bags in which to place the discarded shells after drying them in the sun, and labels to go with the bags. They were not required to disclose the name of the hotel. The programme was arranged in such a way that not even the researcher could say from which hotel a specific set of data had come. A code number was used to enable the matching of a particular record book, and the shells collected by a specific hotel.

The managers all agreed to help and supply the information. However, even after stern reminders were sent out, not one booklet was returned, nor were any shells collected. The ecological advisor to the Transkei Development Corporation finally advised that the hotel managers were not prepared to co-operate.

Coastal cottage owners were approached to provide the same data that was asked of the hotels

(points (i)-(iv) above).

A letter was drawn up, stating the aims of the project, the need for co-operation, and explaining the nature of the data required. A copy of this letter, together with data recording sheets, was distributed through the cottage owners' association to one hundred cottage owners. They were asked to return the data sheets by return of post, and they were supplied with a stamped and addressed reply envelope. Of the hundred letters distributed, only two were returned completed, despite the fact that confidentiality was ensured.

This type of programme which requires people to return information per post has a notoriously poor success rate (Oppenheim, 1967, p.34). This is clearly demonstrated by the failures of the above-mentioned programmes. However, this was the only method available for use in the circumstances. The cause of the failure of the above-mentioned programmes is thought to be threefold in nature:

1. the type of method used, i.e. requiring information to be returned by post;
2. apathy amongst the people concerned; and
3. fear of reproach or incrimination.

2.2.3 Tourist Harvesting and Utilization

A 'Coastal Usage Survey' questionnaire (see Appendix One), was compiled to assess the following:

- (i) tourist use of the intertidal zone;
- (ii) tourist participating in the sale and purchase of shellfish;
- (iii) awareness of existing coastal legislation; and
- (iv) the major factors attracting tourists to the Transkei coast.

The questionnaire was translated into Afrikaans, with both the English and the Afrikaans versions appearing on the same form. The questionnaire was not translated into Xhosa, as the majority of visitors to the coast are white. The Xhosa people who visit the coast are generally able to speak English.

A tourist when approached was asked if he/she would mind completing the form. If they agreed to assist, they were given a form which was collected on completion. A total of two hundred and twelve forms was completed by a sample of tourists including hotel guests, cottage owners, visitors to nature reserves, campers and hikers.

2.3 Results

2.3.1 Harvesting Practices of Indigenous Transkeians

2.3.1.1 Shellfish collectors

It is primarily the women of the household who collect food from the rocky intertidal zone.

It has, however, been reported from Qolora and Mngazana that recently more men are assisting in the harvest of shellfish. This practice is, however, very rare and cannot be said to have any significance at this stage.

Men do collect from the intertidal zone for bait. The species collected are mainly: red bait, *Pyrua stolonifera*, mussel worm, *Pseudoneris variegata*, and octopus, *Octopus sp.*, for fishing purposes. Young boys and the older men collect large numbers of limpets from the upper shore as crayfish bait.

Women start collecting shellfish from between the ages of nine and eleven years, and continue well into their sixties. The young girls, however, play a minor role in the collecting process. They usually form part of a team or group of women, acting as helpmates to their older relatives.

The age of the women collecting was said not to have varied over the years.

2.3.1.2 Frequency of collection

There are two major limiting factors to the frequency with which women collect from the rocks:

- (i) the tide and condition of the sea; and
- (ii) the distance lived from the shore.

Data from the questionnaire revealed that the frequency of collection diminished with distance from the shore:

TABLE 1 : THE RELATIONSHIP BETWEEN FREQUENCY OF COLLECTING AND DISTANCE LIVED FROM THE SHORE

Distance from the shore:	0-1 km	1-6 km	6-10 km
Time taken to reach the shore:	0-1 h	1-2½ h	2½ + h
Mean frequency of collecting per month:	10 times	6 times	3 times

Collecting occurs mainly during three days before and three days after a spring tide, depending on the prevailing weather conditions. If the weather conditions are unfavourable, the women will not collect even at spring low tide as drownings are not uncommon on the coast.

Generally, a women will collect for a maximum of three consecutive days, and not at every possible opportunity.

Neap-tide collecting does occur, on a less intense scale than spring-tide collecting. At Tshani, five women were observed collecting at full neap tide. Collecting in this instance was done in the afternoon from noon to between three thirty and four pm., and was concentrated in the upper balanoid zone. This is contrary to Bigalke's findings of no afternoon collecting (Bigalke, 1973).

The frequency of harvesting during neap tides, as recorded by the local women, is greater than that observed by the cottage owners. They suggest that neap-tide collecting is fairly rare - occurring only during ideal, calm conditions.

Women living close to the coast undertake collecting when shellfish is desired, perhaps two to three times per week. This indicates that the closer the woman lives to the shore, the less she is restricted by tide. The tidal level does, however, still control the collecting zone and thus the species that are available for collection.

The intensity of collection is affected to some extent by environmental factors. The majority of the cottage owners reported that collecting was intensified during periods of drought and food shortage. More women were also observed to

collect, during warmer weather conditions.

The number of collectors, for the most part, are reported to have increased. At Sinangwana, the number of women collecting at a particular site has increased from approximately ten, thirty years ago, to forty today. At Cebe, during the drought, three hundred and sixteen women were observed collecting on a two kilometre stretch of coast.

The increase in numbers has been attributed by the cottage owners to an increase in population and thus increased food demand. The increased food demand has resulted in women from further afield walking to the rocks to harvest shellfish.

In some areas, such as Presley Bay, the number of collectors was observed to decrease when coastal residents were moved and re-established five kilometres inland, thus supporting the assumption that distance from the shore affects the frequency of collection.

The number of collectors may be directly related to the coastal population, but no adequate census has yet been taken of coastal people. Therefore, this information is not available. Aerial photography in 1969 and 1972 did not provide photographs of sufficient quality to enable hut counts

along the coast. This is an aspect that requires thorough investigation in future coastal planning.

2.3.1.3 Method of collection

The method of collection has remained essentially the same over the years, and is well documented by Bigalke (1973).

The shellfish are chopped from the rocks using a long, narrow steel instrument, usually an old plough handle, car spring or tyre lever. The women carry with them a receptacle of some sort, e.g. a tin basin or tin can, or they may make a pouch, using a sack or clothing, which is tied to their waist. As the shellfish is chipped from the rocks, it is placed in the receptacle. When this receptacle is full, it is taken and emptied at a site higher up on the shore. Each woman or family has her own site where the shells are deposited.

When the women have finished collecting, they sort through the pile they have collected, discarding bits of seaweed and animals considered too small to take home. The red bait is removed from its casing. Sea water is then poured over the pile a number of times to wash excess sand from the animals. The washed pile is then placed into a larger receptacle, usually a piece of sacking that is tied to form a bundle, and carried

to the hut.

During the collecting and sorting phases, the women frequently pause to eat. They were observed to eat the following species raw during collecting: *Patella cochlear*, *P. longicosta*, *P. barbara*, *P. miniata*, *Haliotis spadicea*, *Crassostrea cucculata*, *Perna perna* and *Pyura stolonifera*.

The shellfish is usually cooked by boiling in unsalted water, and is eaten on the same day as it has been collected.

2.3.1.4 Species collected

The Transkei coast falls within the transition zone between subtropical east coast species and temperate south coast species. This transition is most significant between Port St. Johns and Qolora, where a mixture of east and south coast species occur, their proportions changing as one progresses from north to south (Stephenson, 1944). Thus, one would expect this gradient to be reflected to some extent in the proportions of species collected by coastal people in the northern, central and southern regions of the Transkei. For the purposes of this study the regions were defined as follows:

Southern - (Kei River to the Bashee River)
Central - (Bashee River to the Mzimvubu)
Northern - (Mzimvubu River to Mzamba)

Information gathered from the food utilization questionnaire revealed that certain species were gathered in different proportions in the different regions (see Table 2).

The questionnaire required that only the Xhosa name for a species be given. This resulted in the problem that in some cases one name in Xhosa covers a group of species, e.g. Isagwegwe is the Xhosa name for limpets. However, this data, together with personal observations, reveals that the following species are exploited by the indigenous people for food: *Perna perna*, *Patella longicosta*, *P. miniata*, *P. barbara*, *P. oculus*, *P. cochlear*, *P. granularis*, *Pyura stolonifera*, *Fissurella natalensis*, *Burnupena lagenaria*, *Charonia lampus pustulata*, *Haliotis spadicea*, *H. midae*, *Dinoplax* spp., *Octopus* spp., *Crassostrea margaritacea*, *Crassostrea cucullata*, *Panulirus homarus*, *Balanus* sp., *Turbo* spp., *Thais* spp., *Nerita* spp. and *Cellana capensis*.

The species collected varies according to the particular tidal cycle during which the collection was made, with spring tide collections containing different species to the neap tide collections.

TABLE 2 : PROPORTION OF RESPONDENTS HARVESTING SPECIES IN THE SOUTHERN, CENTRAL AND NORTHERN REGIONS OF THE TRANSKEI COAST

SCIENTIFIC NAME	XHOSA NAME	SOUTHERN REGION %	CENTRAL REGION %	NORTHERN REGION %
<i>Perna perna</i>	Imbaza	97	76	95
<i>Limpet sp.</i>	Isagwegwe	63	51	26
<i>Patella concolor</i>	Ikolokoqwane/Unojekecane	-	4	-
<i>Crassostrea margaritacea</i>	Imbatyise/Isazwembe	60	67	-
<i>Pyura stolonifera</i>	Isenene	30	55	-
<i>Octopus sp.</i>	Ingwane	53	55	42
<i>Haliotis spadicea</i>	Inyakrala	43	4	-
<i>Haliotis midae</i>	Amangquba	80	-	-
<i>Dinoplax sp.</i>	Umqwayiba/Umqwabulo	33	27	21
<i>Burnupena sp.</i>	Ugqoloza/Inkongo	40	14	-
<i>Charonia lampus pustulata</i>	Inkongo/Intlaba	-	6	-
	Amaqongwe	63	-	-
<i>Panulirus homarus</i>	Ukolofish/Isikhuphathi	-	37	100
<i>Balanus sp.</i>	Intsikitsane	33	-	-

The brown mussel, *Perna perna*, forms the bulk of a spring tide harvest, with the Patellidae and *Pyura stolonifera* also being of major importance.

Cellana capensis, *Patella granularis* and the gastropod snails are the main target of the neap tide collector.

Crassostrea cucculata is usually just casually eaten during the collecting phase, and is seldom harvested seriously for food. *Crassostrea margaritacea* is not a popular food item among the local people, in fact 'married women, except in Pondoland, are not permitted to eat oysters because they are believed to have aphrodisiac properties' (Bigalke, 1973). The oyster does, however, have a significant commercial value, and is mainly harvested for sale to tourists. This was clearly demonstrated over the Easter weekend, 1983, at Tshani, where six women were observed harvesting sack loads of oysters specifically for sale to tourists.

Certain of the women observed collecting along the transect chosen at site 3, Hole in The Wall, were asked to bring their empty shells to the researcher once they had eaten the contents.

Analysis of the meal remains from four collections yielded the data given in Table 3

The brown mussel *Perna perna* dominates the collections. However, a high degree of variability in the numbers collected is evident. This variability appears to be related to two factors, viz. the number of people to be fed from a collection and the number of limpets that are harvested.

In general, the more people that have to be fed from a collection, the greater the number of *Perna perna* harvested. It is also evident, however, that when large numbers of limpets are harvested, smaller numbers of *Perna perna* are collected. This result indicates that individual personal preferences of a particular species may influence the numbers of another species that are collected.

At this site *Patella longicosta* was the most heavily exploited limpet species, followed by *Patella barbara*.

The analysis of meal remains as a method of studying the quantities of various species collected, has the limitation that soft bodied species, i.e. those without shells, such as *Pyura stolonifera* (red bait), are not represented

TABLE 3 : DETAILS OF MEAL REMAINS FROM HOLE IN THE WALL

Collector: Number of People fed from the collection: Time taken to collect:	Single woman 2 adults 2 hours		Single woman 3 adults 1½ hours		Single woman 3 adults 2 children 2 hours		Single woman 4 adults 3 children 2 hours	
Species Collected	Number Collected	Average Total Length (cm)	Number Collected	Average Total Length (cm)	Number Collected	Average Total Length (cm)	Number Collected	Average Total Length (cm)
<i>Perna perna</i>	158	3,78	102	4,74	617	4,4	1 578	4,35
<i>Patella longicosta</i>	27	4,08	84	4,37	234	4,78	23	4,6
<i>Patella barbara</i>	45	4,65	73	4,59	41	7,45	2	4,8
<i>Patella oculus</i>	1	3,4	-	-	-	-	-	-
<i>Patella miniata</i>	11	5,06	28	5,52	18	6,50	3	5,76
<i>Patella cochlear</i>	-	-	26	3,84	11	2,39	4	3,2
<i>Fissurella natalensis</i>	2	3,3	2	3,6	3	2,8	-	-
<i>Haliotis spadicea</i>	-	-	-	-	7	5,58	2	4,22
<i>Burnupena lagenaria</i>	1	-	-	-	-	-	-	-

FIG 2-5 SIZE FREQUENCY DISTRIBUTIONS OF HARVESTED SPECIES

AT SITE 3.

FIG 2. *Berna perna*

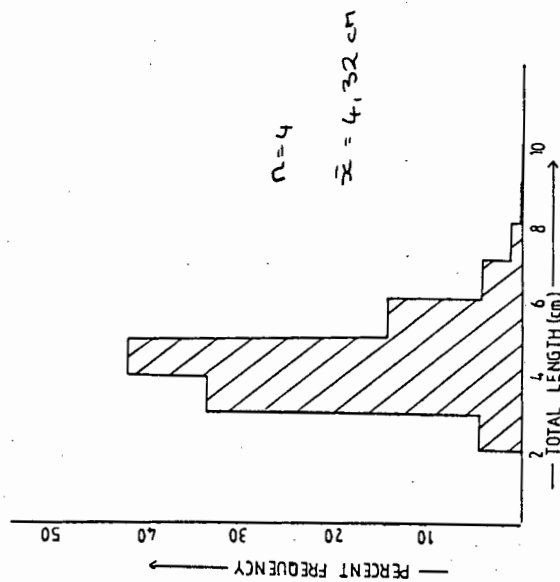


FIG 3. *Patella longirostris*

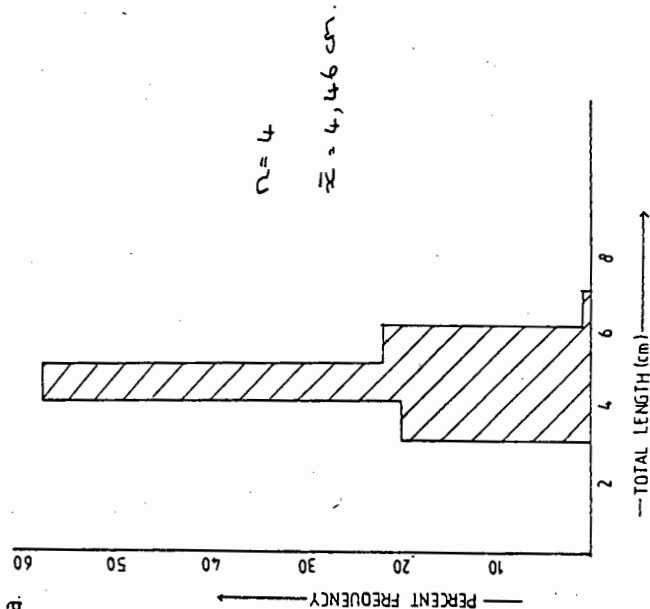


FIG 4. *Patella barchana*

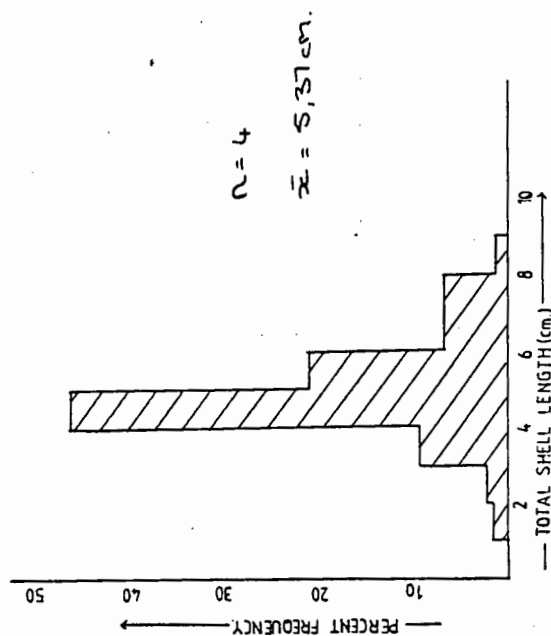
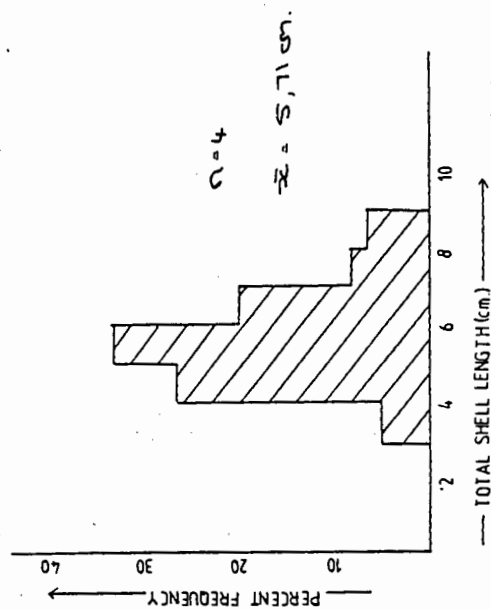


FIG 5. *Patella miniata*



in these meal remains.

The majority of women observed collecting on the lower shore, harvested substantial quantities of *Pyura stolonifera*, in addition to the species listed in Table 3.

Size frequency distributions were constructed to illustrate the harvested size ranges of particular mussel and limpet communities (see Figures 2 to 5).

The average size of *Perna perna* from the meal remains is 4,32 cm. This is considerably larger than the average sizes of 2,7 cm and 3,5 cm obtained in this study from random samples taken at the same site. The average sizes of the limpets in meal remains are also found to be larger than the average sizes from random samples. The implications of these results will be discussed in greater depth in Chapter Four.

2.3.1.5 Economics of shellfish collecting

The tourist industry provides a ready market for mussels, oysters, crayfish, red bait, octopus, and in the south, abalone.

Seventy-five percent of respondents to the food utilization questionnaire indicated that they

either did or were willing to sell the shellfish they had collected. Forty-nine percent indicated that, if offered a choice between money or food as an exchange, they would prefer money; fifteen percent said they would prefer food, specifically mealie meal; and eleven percent would be happy with either.

Current prices for shellfish are as follows:

Oysters : medium enamel bowl : 20-30 cents
 large enamel bowl : 40-50 cents

Mussels : large basin : 50-60 cents
 bucket : R2,00

Abalone : R1,00-R2,00 plus 20 cents for the
 shell

Crayfish : small tail 30 cents
 large tail 50 cents to R1,00 and
 up to R3,00 per tail in holiday
 seasons

Octopus : 20-60 cents each

Respondents reported earning between R4,00 and R15,00 a day for their harvests.

Very few respondents reported collecting for commercial operators, and those that did collected oysters, mussels and crayfish.

2.3.1.6 The exploitation of crayfish

The sale, and thus the exploitation of crayfish has increased dramatically over the last few years. This increase is due to two major factors:

- (i) crayfish is the main target for commercial operators; and
- (ii) improved methods of exploitation.

Years ago the local men used to catch crayfish by means of spearing - using a carbide lamp and a spear at night. This has since been prohibited, giving way to new methods.

Men and young boys, nowadays, fish for crayfish at night, using limpets as bait. Several limpets are attached to a piece of wire or nylon fishing thread approximately 20 cm long. This is lowered into the sea, and as soon as a crayfish attaches itself to the limpets, the wire is whipped out of the water onto the rocks. The crayfish lets go of the limpets and is captured.

Diving for crayfish has become common over the last five years or so. This has become a cause for concern in that the local people are learning to use fairly 'sophisticated' equipment. The divers use goggles, and some have been seen to use snorkels and weight belts. Gloves are also

commonly worn. The men carry with them a hooked spear with which to pull the crayfish from their holes.

In most areas it is only the young men and boys who dive. However, from Mpande northwards, women are also reported to dive for crayfish. This is a fairly recent trend in crayfish exploitation, only appearing within the last five to ten years. It is most unusual, as elsewhere on the coast the women display a healthy respect for the sea, and would be too afraid to dive.

Crayfish are also believed to have aphrodisiac properties (Bigalke, 1973), which prohibits the married women from eating them. Crayfish are becoming more popular among the locals as a food item, but in many areas, those that have not been sold are merely discarded. Thus, the prime motivation for crayfish exploitation appears to be financial gain.

2.3.2 Further Aspects of The Rural Diet

2.3.2.1 Crop production and utilization

Crops are planted in both the fields allocated to a family and their smaller, private gardens. Mealies, beans, and pumpkins are the most common crops planted, and they are planted in both the fields and the gardens. August to December is

the major crop-planting season, with only peas and sweet-potatoes being planted during winter. The common vegetables, such as cabbage and spinach are planted throughout the year.

Concern may be expressed by the fact that fifty-one percent of the respondents reported growing no vegetables additional to the general maize, beans, pumpkin and potatoes (see Table 4).

TABLE 4 : PROPORTION OF RESPONDENTS PRODUCING
EACH CROP TYPE

<u>Crop Type</u>	<u>Percentage</u>
Mealies	95
Beans	76
Pumpkin	75
Sweet Potatoes	31
Potatoes	23
Melon	23
Cabbage	22
Peas	16
Spinach	14
Millet	9
Wheat	8
Madumbe	5
Carrots	5
Turnips	4
Beetroot	4
Tomatoes	4
Squash	2
Onion	2
Unspecified Vegetables	5
Bananas	2
Guavas	1

Wild fruit and vegetables were harvested by 78% of the respondents.

The success of the crops is naturally directly influenced by environmental factors such as rainfall. A drought such as the one experienced recently in the Transkei affects more than just the diet of the rural people, it has far-reaching consequences to the local economy.

Fifty-seven percent of respondents reported having enough seed over to plant the following year's crop. However, during a drought, this figure is reduced to twenty-seven percent. Forty-nine percent of the respondents were able, during good years, to sell their surplus maize crop (after filling their storage areas). During a drought this supply of income is decreased, while at the same time expenses are increased in that food and seed have to be bought from the local trading store, where prices are higher than in the towns. Thus, it is not surprising that the intensity of shellfood collecting increases during times of drought, as it acts both as a food source and a source of income.

2.3.2.2 Livestock utilization

Most respondents reported keeping cattle, goats and sheep. These animals are, however, rarely eaten. Cattle are only slaughtered when there

is a very special feast, such as at weddings and funerals. Goats and sheep are also slaughtered for special occasions, e.g. Intonjane (traditional ceremony following a young unmarried girls first menstruation), circumcisions, christmas, and weddings. These animals, although highly regarded, are more readily slaughtered than an ox, and on occasions are slaughtered just when the family feels like meat. No respondent ever reported selling the meat of these animals, however, goats and sheep are sold either alive or already slaughtered on occasions (Mrs N.C.Dlulane pers. comm.).

Pigs are slaughtered when meat is required or when a family "feels like meat", and are not slaughtered for any of the special traditional feasts. They are readily offered for sale at prices of between R60 and R100 per adult pig. Although pigs seem able to fill a special role as a source of available protein, and as a good source of income, only thirty-three percent of the respondents reported keeping pigs. Of these forty-eight percent reported selling pork when necessary.

Chickens are the most readily slaughtered animals. Most respondents who owned chickens ate chicken regularly, i.e. once per week or at least once per month. However, despite the fact that chickens seem a rather convenient source of protein, only forty-three percent of respondents kept chickens.

2.3.3 Tourist Utilization of the Rocky Shore

Previous reports (Anon., 1977a, Anon., 1977b, Siegfried, 1977) have suggested that tourism has had a significant effect on the exploitation of the intertidal rocky shore, and that the "rock stripping activities of tourists" should be strictly controlled (Anon., 1977a). There has, however, been no information either qualitative or quantitative, to support or oppose these statements.

Information on tourist numbers is difficult to obtain. However, the following data with respect to the bed nights sold annually by the nine Transkei development corporation hotels were made available (Table 5).

TABLE 5 : ANNUAL COMPARISON OF BED NIGHTS SOLD*

Year	1981/1982	1982/1983	1983/1984
Total bed nights sold	117 101	131 289	130 346

The 1983/1984 figure (calculated from April 1983 to March 1984) is down by 0,72% on 1982/1983 and up by 11,31% on 1982/1983.

* Information supplied by the Transkei Development Corporation.

It must be emphasized that the above figures do not include all the hotels on the coast, e.g. The Wild Coast Holiday Inn and Casino is not represented. This obviously increases tourist figures, but its effect is localised - not contributing to the general trend in tourism along the coast.

The nature reserves continue to be well visited, and it has become difficult to get accommodation in a reserve without advance booking, especially over holiday periods. However, since the nature reserves were only established within the last ten years, this is a fairly recent form of tourism.

The number of cottages along the coast remains fairly constant at approximately three hundred and fifty, and thus cannot be seen as a contributory factor in increasing tourism on the coast.

Camping and hiking continue to be popular on the Transkei coast, but unfortunately no statistics are available to indicate the extent of this contribution to tourism on the coast.

Investigation into the use of the coastal area by tourists was carried out by way of the coastal usage survey. The results from the survey yielded the following details with respect to use of the rocky shore:

2.3.3.1 Personal harvesting of Mussels,
Oysters and Crayfish

A total of thirty-five percent of the respondents reported harvesting for personal consumption. A more detailed analysis gave the results in Table 6.

TABLE 6 : PROPORTION OF PERSONAL HARVESTING
PER ACCOMMODATION TYPE

Accommodation Type	Hotel	Private Cottage	*Hired Cottage	Nature Reserve	Camping	TOTAL
Total number of Respondents	75	41	35	28	32	212
Proportion Harvesting for Personal Consumption	21%	37%	51%	46%	38%	35%

* Hired Cottage in this case refers to non-residents of Transkei, staying in friends' or relatives' cottages on the coast.

It is interesting to note the relatively high percentage of visitors to nature reserves harvesting shellfish.

2.3.3.2 The purchase of shellfish

There is no evidence to suggest that the purchase of shellfish has increased over the years, in fact a decrease in the availability of shellfish for

sale has been reported by people who have visited the coast over many years. The decrease in the sale/purchase of shell fish has been attributed to the following:

- (i) Scarcity of large mussels, oysters and crayfish, due to overexploitation. Oysters and crayfish being significantly affected by the commercial market.
- (ii) Stricter control by fisheries officers. There have been regular spot-checks with heavy fines for transgressors of the regulations.
- (iii) The competition afforded by commercial companies has affected the sale to private individuals. The hotels specialize in weekly seafood suppers, the ingredients of which are purchased from the local population.

The coastal usage survey revealed the following with respect to the accessibility and purchase of shellfish:

Thirty-nine percent of respondents reported purchasing shellfood from the local people. However, of the total number of respondents, forty were first-time visitors to the coast

who did not purchase shellfood nor did they find it readily offered for sale. The survey form did not ask that the date be recorded, which makes it impossible to determine whether the visitors were at the coast over a spring tide period or not. This introduces a limitation into the proportion of respondents purchasing shellfood, and was a shortcoming of the survey design.

Since the residents of the Transkei, and the cottage owners in particular, offer a regular outlet for the sale of shellfish, it was decided to deal with this aspect in the analysis of the survey results. Table 7 shows the proportion of visitors to, and residents of Transkei, that report purchasing shellfish.

TABLE 7 : PROPORTION OF VISITORS TO, AND RESIDENTS OF TRANSKEI WHO HAVE PURCHASED SHELLFOOD

	Residents of Transkei		Visitors to Transkei
	Cottage Owners	Others	
Total Number of Respondents	41	21	150
Proportion Purchasing Shellfish (%)	68	38	31

2.3.3.3 Bait collection

The Transkei coast is often called a fisherman's paradise. As certain species such as red bait, *Pyura stolinifera*, are common bait species the consequences of this sport on the rocky shore fauna should be considered.

The survey revealed that of the 121 fisherman who responded to the survey, only 66 or 55% used rock bait. Table 8 shows the bait species used, and the number of fishermen using each bait type.

Rock bait was not the only bait type used by these fishermen, and the impact, therefore, of bait collecting by tourists who have access to other bait types, such as sardine, is apparently not very important and perhaps negligible.

TABLE 8 : NUMBER OF FISHERMEN USING EACH
ROCK BAIT SPECIES

Bait Type	Red bait	Mussel	Squid	Crayfish	Crab	Mussel- worm
Number of Fisherman Using Bait Type	61	3	8	1	1	1

2.3.4 Commercial Exploitation of Rocky Shore

The commercial exploitation of the coast by companies for profit is an area of grave concern. Reports as to the inefficiency with which these firms operate, and the destruction that they cause, e.g. the stripping of oyster beds, are numerous. These reports cannot be substantiated, but they do call for investigation into the system of commercial licensing, and the requirements for obtaining a commercial licence.

Commercial licences are granted by the Transkei Department of Commerce, Industry and Tourism, as they control the Sea Fisheries Act. The procedure for procuring a licence is as follows:

The applicant submits the relevant application forms (see Appendix 3) to the Department of Commerce, Industry and Tourism. This application is then sent to the Department of Agriculture and Forestry Nature Conservation Division for comment and recommendation. The division of Nature Conservation may approach the Natural Resources Liason Committee for advice. This is a voluntary step which may or may not be taken. The Division of Nature Conservation is asked to recommend the quotas to be allocated, and the division is responsible for the policing

of the operation if the licence is granted.

The final decision in granting a licence lies with the Department of Commerce, Industry and Tourism.

The conditions which have to be met before a commercial fishing licence can be granted are as follows:

The applicant must ensure that -

- (a) their ski-boats be registered with the local ski-boat club, and the boats must be sea-worthy;
- (b) they do not fish in the river mouths and the closed nature reserve areas;
- (c) they do not catch under-size fish;
- (d) they comply with the Health Department regulations by storing and transporting fish in refrigerated facilities;
- (e) they supply the Department with their monthly catch statistics; and they
- (f) pay the licence fees at the rate of R50,00, subject to adjustment yearly in line with their catch weights.

This is an outline of what, theoretically, should take place. In practice, however, these conditions do not always apply.

Because Transkei is still very much a developing country, it is government policy to give every assistance to entrepreneurs. This means in some cases, overlooking 'temporarily' certain conditions. For example, when discussing conditions (d) and (e) above, an official of the Department of Commerce, Industry and Tourism explained that these conditions were not enforced in new companies, as the Department realised the difficulties encountered by companies wishing to exploit the intertidal zone. They would waive the conditions until such time as the company has established itself.

This attitude has dangerous consequences as far as the exploitation of the rocky shores is concerned. Allegations of large numbers of crayfish, and sacks of oysters being lost as a result of the promised trucks not arriving to collect them have been made. Most commercial operators hire the indigenous people to collect the shellfish, and undertake to collect their harvest on a particular day. Thus, due to the looseness of the system, a great deal of damage to the rocky shore ecosystem can be caused in the process of a company 'establishing' itself.

At present there are six commercial companies licenced to exploit the intertidal rocky shore on the Transkei coast. One of these is the Wild

Coast Holiday Inn at Mzamba. This is the only hotel with a commercial licence on the coast, although, currently it is being argued that commercial licences be granted to the other hotels, as a step to control the current "illegal" buying of shellfish from the indigenous people for the use of the hotels. No catch statistics were available from Mzamba.

Probably the best known and established company operating on the coast in Transkei Sea Harvest. This company has five major operating points on the coast. They are Mpame, Bulawu, Njela, Msikaba and Ncambeni. All these points, with the exception of Mpame, lie between the Umtata mouth and Port St. Johns.

The company is licensed to collect crayfish, oysters and mussels, but as yet they do not operate under a quota system. Crayfish are their main target. They have found the oysters to be of poor quality and therefore of not much commercial value at present. There is no exploitation of mussels at this stage. Regular catch returns have not been supplied, and this is a matter currently receiving the attention of The Department of Commerce, Industry and Tourism. The returns from March, April and May 1983 were made available and are given in Table 9.

TABLE 9 : TRANSKEI SEA HARVEST 'CATCH STATISTICS'

SPECIES/COMMON NAME	NO.	AVERAGE BODY LENGTH (IN CM)	BODY MASS IN GMS/KG (IF POSSIBLE)
March, 1983	Oysters	1,581 Doz	
April, 1983	Oysters	4,348 Doz	
May, 1983	Oysters	2,262 Doz	
March, 1983	Crayfish	626,4 kg	
April, 1983	Crayfish	519,6 kg	
May, 1983	Crayfish	334,4 kg	

SIGNED:

COMPANY DESIGNATION: Managing Director DATE ...24.6.83.....

It is evident from the erroneous completion of the catch return form that not much attention is given to these catch returns, nor is accuracy demanded from the Department of Commerce, Industry and Tourism.

Of the remaining four companies, not much is known. Two of them have not operated at all and the other two have not been very successful. This is according to an official of the Department of Commerce, Industry and Tourism.

A company, Taurus Chemicals, is currently harvesting Gelidium seaweed from the intertidal zone, and have been doing so for a number of years. Local indigenous people are employed to collect the seaweed in accordance with government policy. They are operating under licence, and supply regular catch returns (P. Dutton pers. comm.)

CHAPTER THREE - THE ROCKY SHORE BIOTIC COMMUNITIES

3.1 Introduction

The geographical distribution patterns of coastal marine organisms have been extensively studied (Stephenson, 1948 , Ekman, 1953 , Jackson 1976, Brown & Jarman, 1978), and are an important consideration in any study involving the comparison of rocky shore fauna from different areas.

Stephenson recognized three distinct marine provinces in the Southern African region (Stephenson, 1944) viz. the East coast extending from Mocambique to Port St Johns and containing both tropical and sub-tropical species, the South coast extending from Port St Johns to cape point and containing warm temperate species and the West coast extending from cape point to Walvis Bay and containing cold loving organisms. In addition to the three major provinces, Stephenson also recognized areas of overlap or transition zones (Stephenson, 1944). The Transkei coast falls within the transition zone between east coast species and south coast species. This transition is most marked between Port St Johns and Qolora and affects the fauna of the region more than the flora, 114 species were recorded at Port St Johns and 107 at Qolora (Stephenson, 1944 p.293).

This organization of marine provinces has largely been accepted by other researchers in the field (Ekman,1953 . Brown & Jarman, 1978) , however, it has been expanded upon in more recent years (Jackson,1976 Brown & Jarman 1978) .

There are two major environmental factors responsible for the distribution patterns of organisms viz. the degree of separation of the shallow water areas and particularly the continental shelves of the landmasses, and temperature (Brown & Jarman 1978). Of the two, temperature (which in turn is influenced by ocean currents) is the most important influencing factor in the Southern African region (Stephenson, 1944).

Marine organisms may be classified as either stenothermic or eurythermic on the basis of their response to temperature change. Stenothermic species decrease in abundance as the limits of their temperature range are reached, eurythermal species are wide ranging species, but they undergo some change either size, colour or abundance as the average temperature changes in different parts of their range, e.g. Patella granularis (Stephenson, 1944).

Thus it is very evident that the diversity and species composition on any particular rocky shore is influenced considerably by these biogeographic considerations. However, even within the distribution range of any species whether eurythermal or stenothermal, there may be considerable fluctuations in abundance due to specific localized environmental factors (Jackson 1976).

The intertidal zone of a rocky shore constitutes a highly complex ecosystem, with species having to adapt to periodic submergence in saline water, alternating with periods of aerial exposure (Lewis, 1964, Newell, 1979, Branch G.M. & Branch M, 1981).

The distribution, abundance and diversity of rocky shore biota has been the topic of a great deal of research and discussion (Connell, 1972, Mc Lachlan et al, 1980, Paine, 1966).

The distribution of a species on a shore is closely linked to their degree of exposure and the tidal levels (Stephenson & Stephenson, 1972). Organisms being restricted to distinct horizontal bands or zones. Physical environmental factors such as wave action (Jones and Demetropoulos, 1968; Seapy and Littler, 1982); slope (Anon., 1977a) aspect (Connell, 1972) and dessication (Broekhuysen, 1940), are all important in determining particularly the upper limits of each zone. The lower limits of a species zone are influenced to a greater extent by competition and predation (Dayton, 1971; Paine, 1966; Hawkins and Hartnoll, 1982; Branch, 1975b).

Each rocky shore exhibits certain variations in community structure, due to the interaction of the various influencing factors (Newell, 1979; Dayton 1971; Connell, 1972). This makes the comparison of different rocky shore sites very difficult, and care must be taken when considering factors such as ditribution and abundance of species, that the specific environmental factors at each site are taken into account when interpreting the data. This is particularly true of comparisons of rocky shore sites from different areas along the Transkei coast where biogeographical environmental factors are also important.

data. One would expect, however, that a gross external disturbance such as the exploitation of shellfish by local tribespeople for food would have a specific and recognisable impact on the rocky shore biotic communities, and that this would be recognisable above local variations in community structure.

To date only work of a preliminary nature has been done on the Transkei coast. From July to August 1977 the Oceanographic Research Institute conducted a survey to investigate "the nature and present condition of life in the inter- and sub-tidal zones" (Oceanographic Research Institute, Report, 1977). Preliminary estimations of biomass and the size and class composition of certain organisms were made but, it was stressed, more intensive work in this area was necessary. The findings of this study are discussed at a later stage in the result section of this chapter and Chapter Four.

In September 1977 various departments, viz. The FitzPatrick Institute, the Botany and Zoology departments of the University of Cape Town, conducted a survey on "Selected Communities of Plants and Animals at Dwesa Nature Reserve", and produced a preliminary report (Siegfried (ed.), 1977). In this report a protected area within the reserve was compared with an exploited area. This allows for interesting comparisons with the present study, and will be discussed in greater detail with the results of this study. It was, however,

evident that more work in this area was necessary, in order to gain a greater understanding of the Transkei intertidal rocky shore fauna.

Prof. A. Dye and Dr. T. Dye of the University of Transkei have an extensive research programme underway at present. They are investigating the growth, reproduction and recruitment of certain key species, and the re-colonization of cleared areas. The study is longitudinal in nature, and they have study sites along the entire coast. This study, when complete, will be the most extensive and detailed work ever done on the coast, and will be an essential reference in future coastal planning.

The present study was done in conjunction with the University of Transkei, and will form a small section of the larger study. The detailed interpretations and recommendations from this study will have to be reviewed at a later stage in the light of the information obtained in the above-mentioned study.

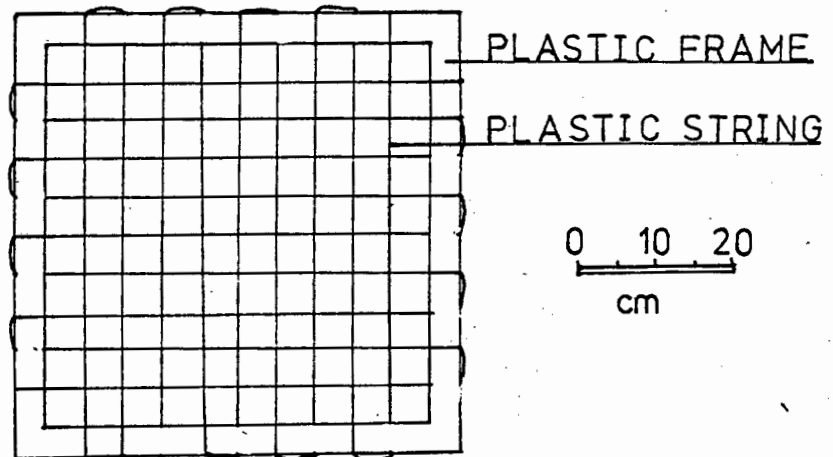
3.2 Materials and Methods

3.2.1 Materials

A quadrat 50 cm x 50 cm was used as the basic sampling tool. The quadrat (made by Prof. A. Dye) consisted of P.V.C. piping making up the frame, and plastic string strung across the quadrat at

5 cm intervals in both planes, forming a grid system (see Figure 6a).

FIGURE 6a : DIAGRAM OF QUADRAT USED IN SAMPLING



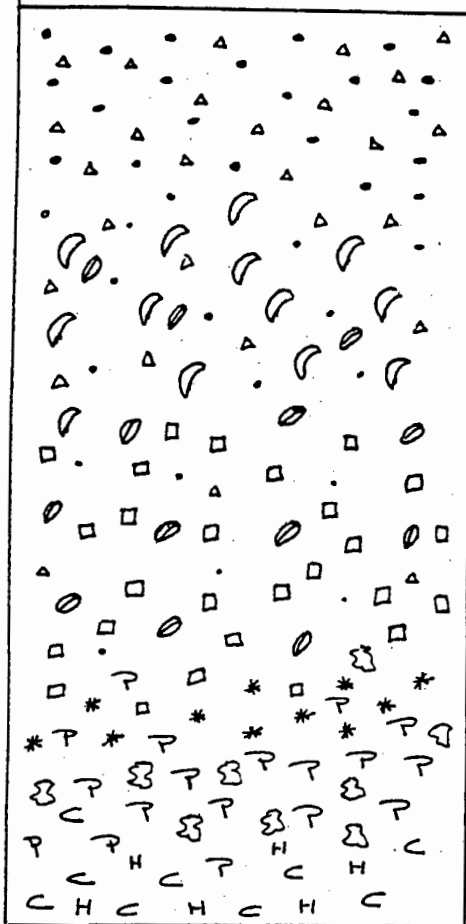
Scraping of organisms from the rocks was done using hammers, chisels and paint scrapers. A 10% formalin solution was used as preserving fluid.

Photography was done with a Minolta 35 mm camera and an Olympus OM1 35 mm camera with a 25-100 mm macro-zoom lens. The film used was Kodak Ektachrome 200 ASA colour slide film.

3.2.2 Methods

A transect was chosen normal to the shore at each site. Data were then collected from each zone of the shore (see Figure 7) along the transect. The sampling differed in relation to the zone being

FIG.7: GENERALIZED ZONATION PATTERN



LITTORINA ZONE

CRASSOSTREA ZONE

BALANOID ZONE

PERNA-CORALLINE ALGAL TURF
ZONE

KEY:

•••	<u>Littorina africana</u>
△△△	<u>Littorina knysnaensis</u>
◐◐	<u>Crassostrea cucullata</u>
◉◉	Limpets
◻◻	Barnacles
•	<u>Pomatoleios kraussii</u>
P P	<u>Perna perna</u>
◉◉	<u>Patella spp</u>
<<	Coralline Algal Turf
H H	<u>Hypnea specifera</u>

(Adapted from: Anon.1977a).

sampled and will, therefore, be discussed under the headings of the various zones. The vertical zonation pattern of rocky shores along the Transkei coast differs slightly from the zonation pattern of the East coast species recorded in Natal (Jackson, 1976; Anon., 1977a). Below the balanoid zone, the Pomatoleios zone, the mussel zone, and the coralline zone are not always clearly separate, and have therefore, for the purposes of this study been referred to as a single zone, the Perna-Coralline algal turf zone (See Fig.7). Hypnea spicifera was relatively uncommon, and certainly never dominated in a particular band so as to form a separate zone.

Each site was sampled twice, once in May 1983 (Autumn sample) and again in August-September (Winter sample). The same procedure was used in both sampling sessions.

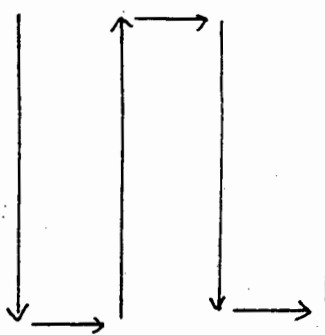
The identification of specimens was based on descriptions in Day (1969), Kilburn and Rippey (1982), Branch G.M. and Branch M. (1981), and Richards (1981).

3.2.2.1 The Perna-Coralline Algal Turf Zone

A series of photographs was taken to estimate the percentage cover of the brown mussel, *Perna perna*, relative to the percentage cover of algae.

The complete quadrat was photographed and then flipped over, moving down the shore with successive quadrats and photographed in each position. This procedure was repeated until a distance of 4 m had been covered, i.e. eight successive photographs were taken. The quadrat was then flipped once in the opposite plane, i.e. moving along the shore shore and photographed. It was then flipped vertically in the opposite direction to the previous series and photographed. This was repeated for a distance of 4 m. The entire procedure was repeated until a continuous area 4m by 2m had been photographed.

FIGURE 6b : DIAGRAM SHOWING THE PHOTOGRAPHIC SEQUENCE



To determine percentage cover, the following procedure was followed:

Each block of the grid on the photograph represented 1% cover. The proportion of coralline algal turf, *Perna perna* or rock with encrusting algae was estimated for each block. The total from all the blocks was then summed to give the percentage cover for that quadrat.

In order to obtain a random sample, a 25 cm² corner section of the quadrat was selected prior to sampling, e.g. the top right-hand corner. The quadrat was then tossed at random within a zone. Each time the quadrat landed, the organisms in the preselected corner were scraped from the rocks and placed in a large bucket. The above-mentioned procedure was continued until a total area of 1 m² had been scraped. The pooling of

samples constituted a basic sampling error in that it reduced the total number of samples taken, and hence their statistical value.

If the quadrat landed over a rock pool or deep crevice, it was tossed again, as only the flat surface of the rock was being sampled.

In a few instances, conditions did not allow for the scraping of an area of 1 m^2 , and in these cases data were corrected to 1 m^2 . This occurred at site 1, Mendwana, where during the first sampling session a total area of $\frac{1}{2} \text{ m}^2$ was scraped, and during the second sampling session a total of $\frac{3}{4} \text{ m}^2$ was scraped. During the second sampling session at site 4, Coffee Bay, a total area of $\frac{1}{2} \text{ m}^2$ was scraped, as it was decided after analysis of the first m^2 sample that this area would be representative of this site.

Sample analysis in the lab followed the following procedure:

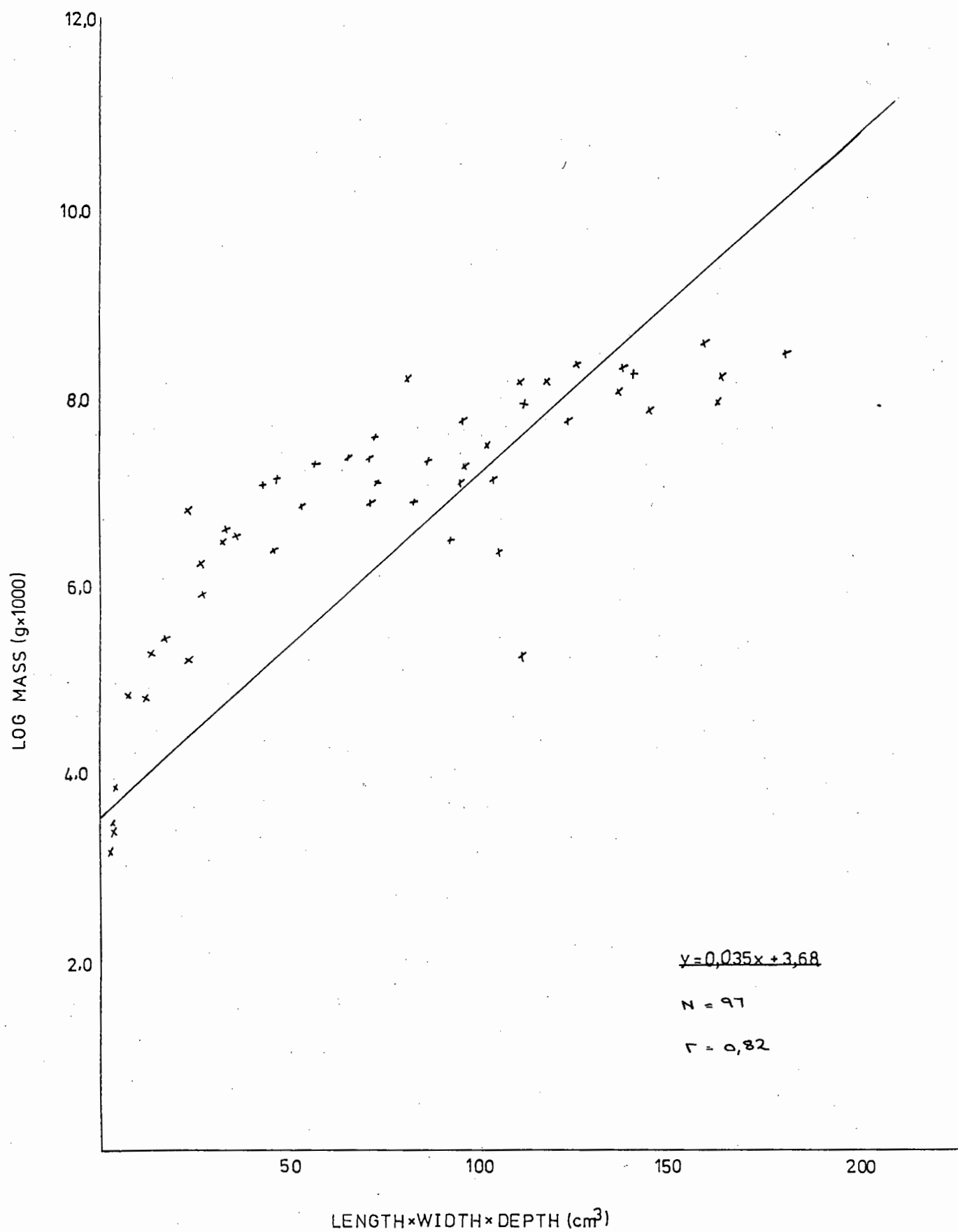
The preserved sample was washed through a $0,5\mu\text{m}$ sieve. The washed sample was then placed in a sorting tray, and sorted broadly into species or class. The specimens that could be identified by the researcher were identified, and those that the researcher was unable to identify were given to a zoology honours student of the University

of Cape Town to identify. The identified specimens were counted, and the "organic" biomass obtained. Dry organic biomass was obtained by drying the specimen at 60 °C for a period of no less than twenty-four hours. Where necessary, i.e. in cases where the shell or inorganic material could not be removed adequately, the ash-free dry biomass was obtained. This was done by first obtaining the dry biomass as outlined above, and then the specimen in an ashing oven at 560 °C . The ash weight was determined by weighing the sample. The ash weight was then subtracted from the dry biomass to yield the ash-free dry biomass.

In the case of the mussels, limpets and other gastropods, the total length, width, and depth of every specimen was measured by using measuring calipers, before the specimen was dried. This method yielded data on the size-biomass relationship of the organisms.

A length-width-depth / biomass regression for site 2 (Dwesa camp site) *Perna perna* (Figure 8) was used to estimate biomass in the winter sample. It was intended that this method be used at each site for the winter sample, so that the flesh could be used for food. Circumstances,

FIG.8 LENGTH-WIDTH-DEPTH -LOG MASS REGRESSION: SITE2 *Perna perna*



however, prevented the use of this method at the other sites.

3.2.2.2 The Balanoid Zone

Use was made in this zone of both physical sampling, i.e. scraping of areas, and a photographic technique.

A 25 cm² corner section of the quadrat was selected prior to sampling. The quadrat was then tossed at random in this zone. After each toss the area under the preselected corner was scraped. On eight occasions, i.e. a total area of 0,5 m², the area was first photographed and then scraped. This was done to allow for comparison of the two techniques in terms of the species present and the number of each species. The scraped sample was placed in a container with a 10% formalin solution, and the number of the photograph as recorded by the camera, was recorded on the container.

Unfortunately, this method did not prove successful, and only 24 out of 56 samples would be compared with any certainty to the slide. The major factor contributing to this failure appears to have been an inconsistency between the slide number as recorded by the camera and the actual slide number.

A representative number and size ranges of the common limpets of this zone, viz. *Patella granularis*, *Cellana capensis*, and *Fissurella natalensis* were collected in order to establish a length-mass regression. The purpose of the regression was to determine the dry biomass of these species from the measurement of shells on the slides.

In the laboratory the total length, depth and width of the shell was measured. The animal was then removed from the shell and the dry biomass obtained by drying the animal without its shell in an oven at 60 °C for a period no less than 24 hours.

The total length was then correlated to the log of the mass multiplied by 1000. The mass was multiplied in this way to obviate the problem of negative logs. In view of the high correlation between total shell length and the log of the mass (see Table 10), it was decided to ignore the width and depth factors. Linear regressions were drawn for each species (see Figures 9 to 19).

FIG 9 . TOTAL LENGTH-LOG MASS REGRESSION: SITE 1 *Patella granularis*

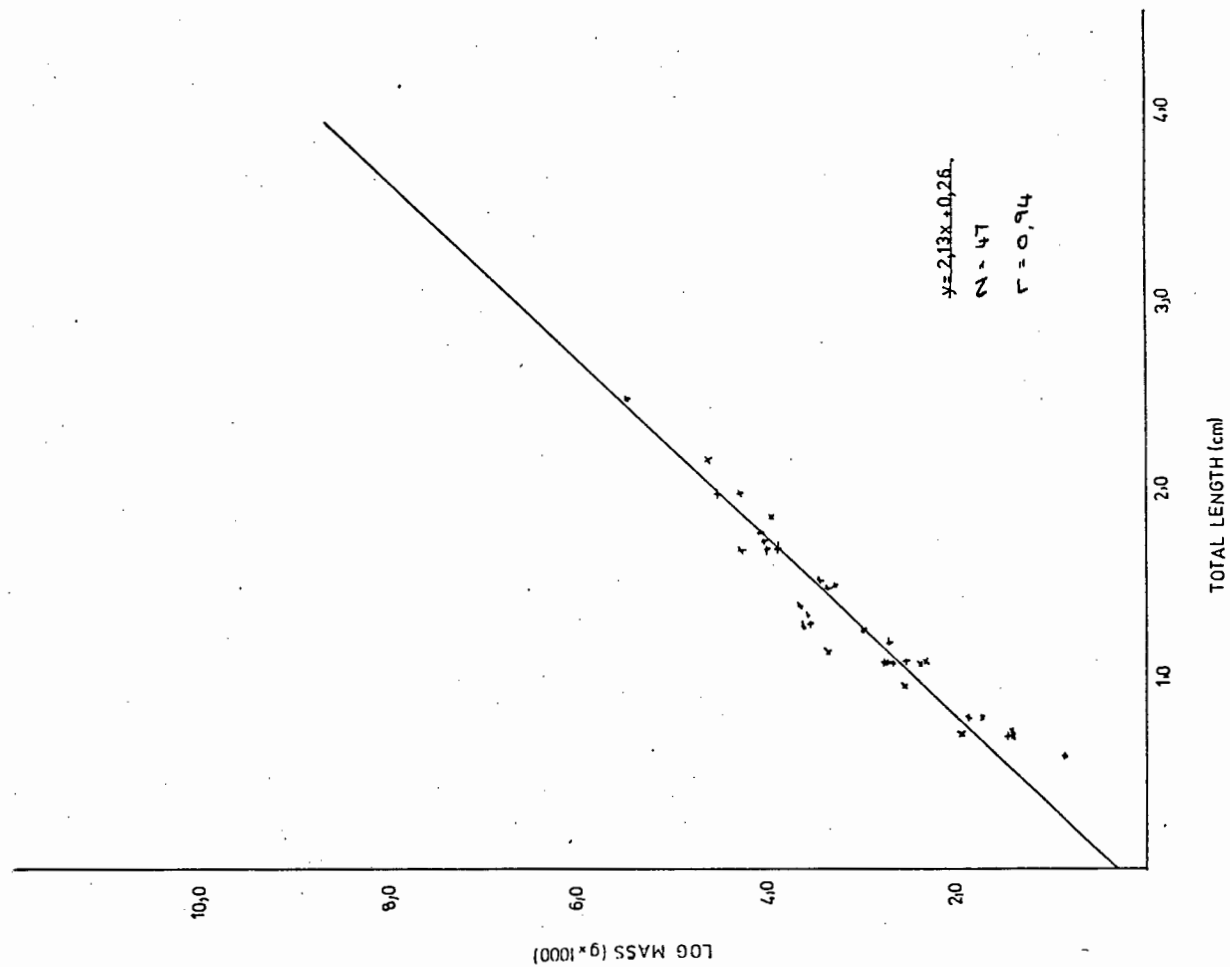


FIG 10 TOTAL LENGTH-LOG MASS REGRESSION: SITE 1 *Cellana capensis*

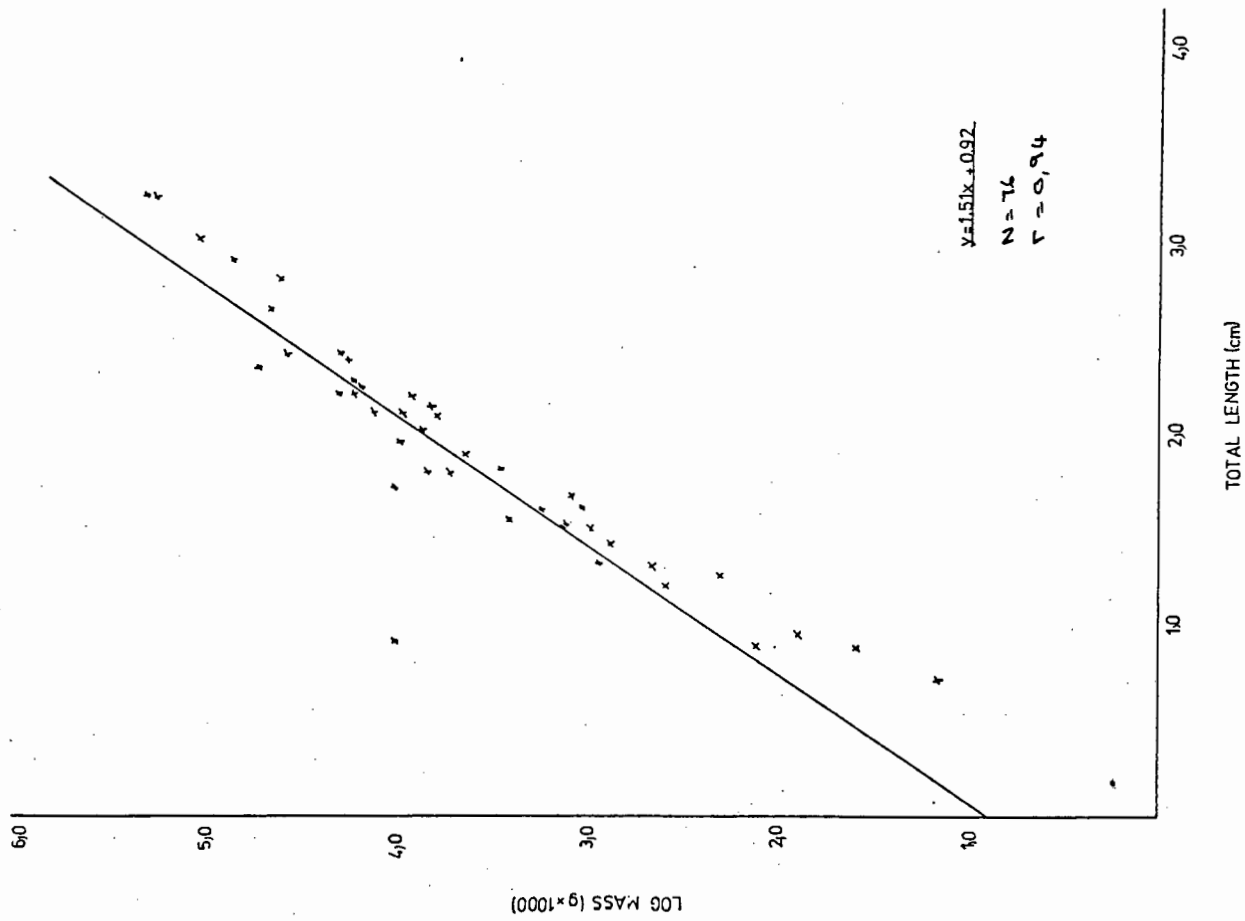


FIG 11 TOTAL LENGTH-LOG MASS REGRESSION: SITE 1 *Fissurella natalensis*

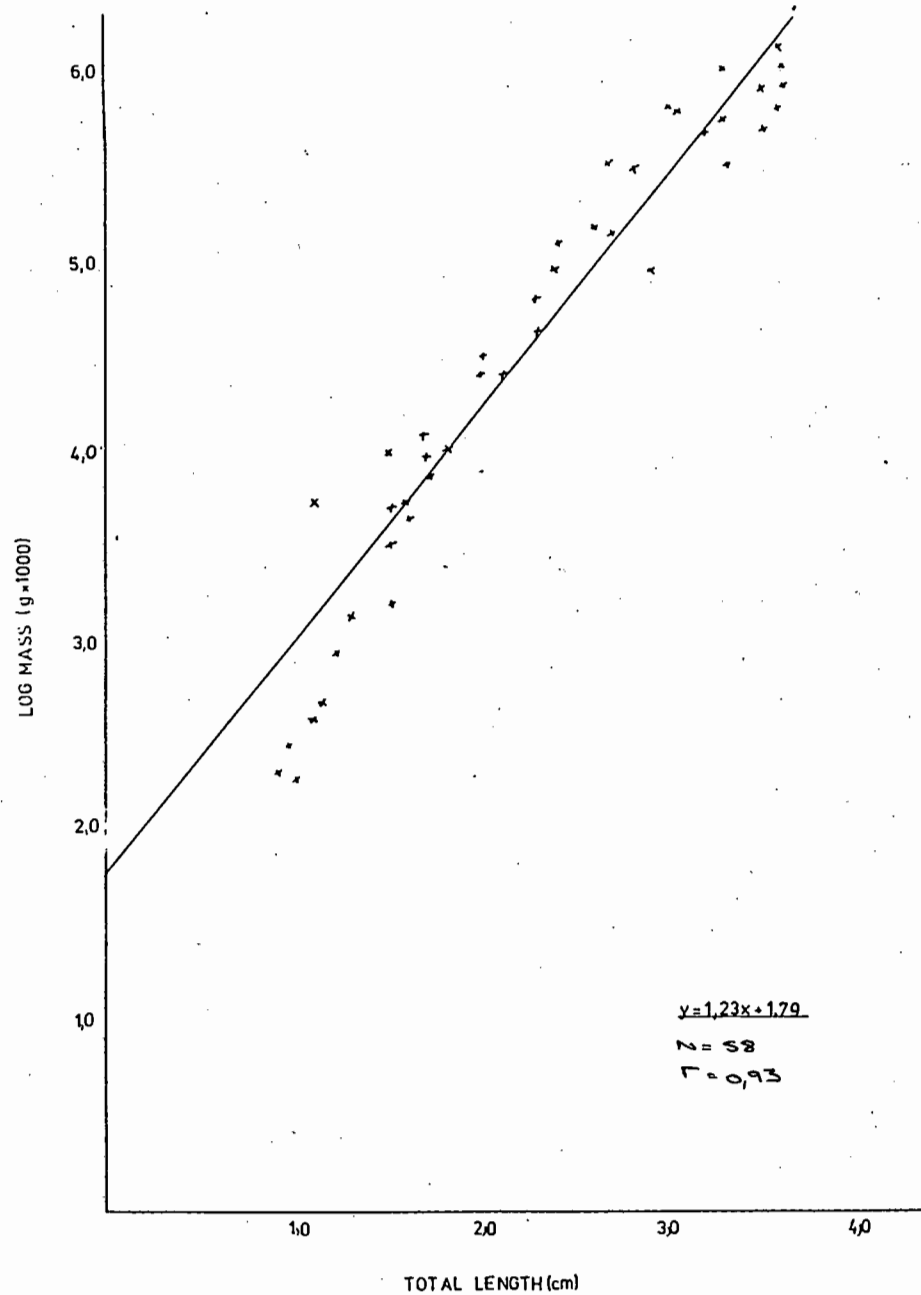


FIG 12 TOTAL LENGTH-LOG MASS REGRESSION SITE 2 *Patella granularis*

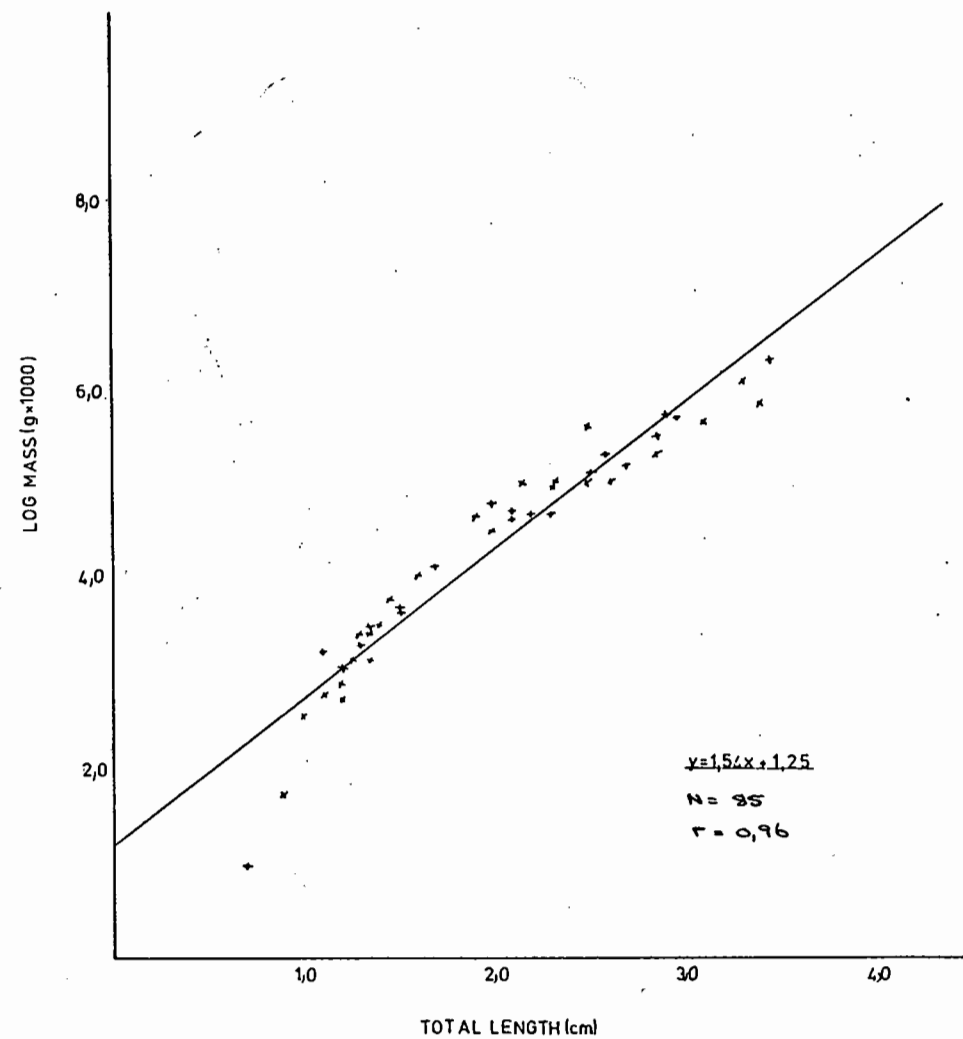


FIG.13 TOTAL LENGTH LOG MASS REGRESSION: SITE 2 *Cellana capensis*

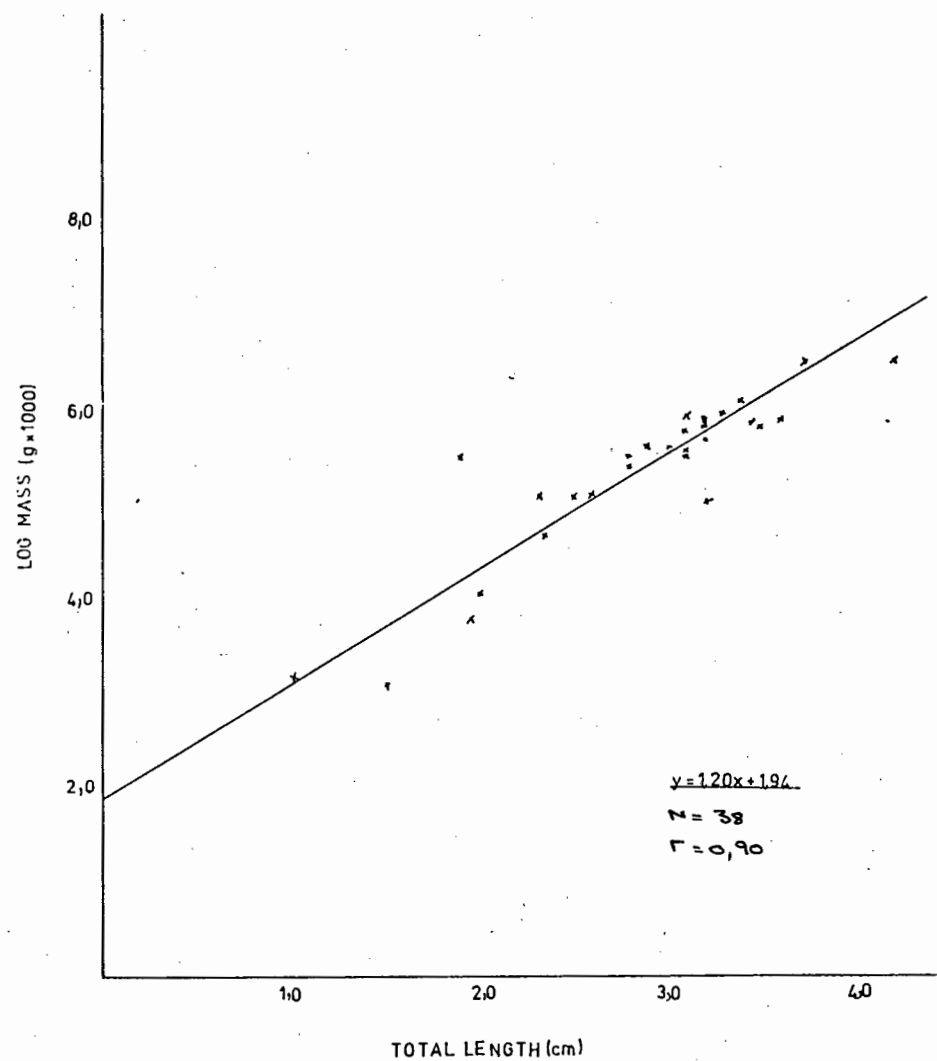


FIG.14: TOTAL LENGTH-LOG MASS REGRESSION: SITE 2 *Fissurella natalensis*

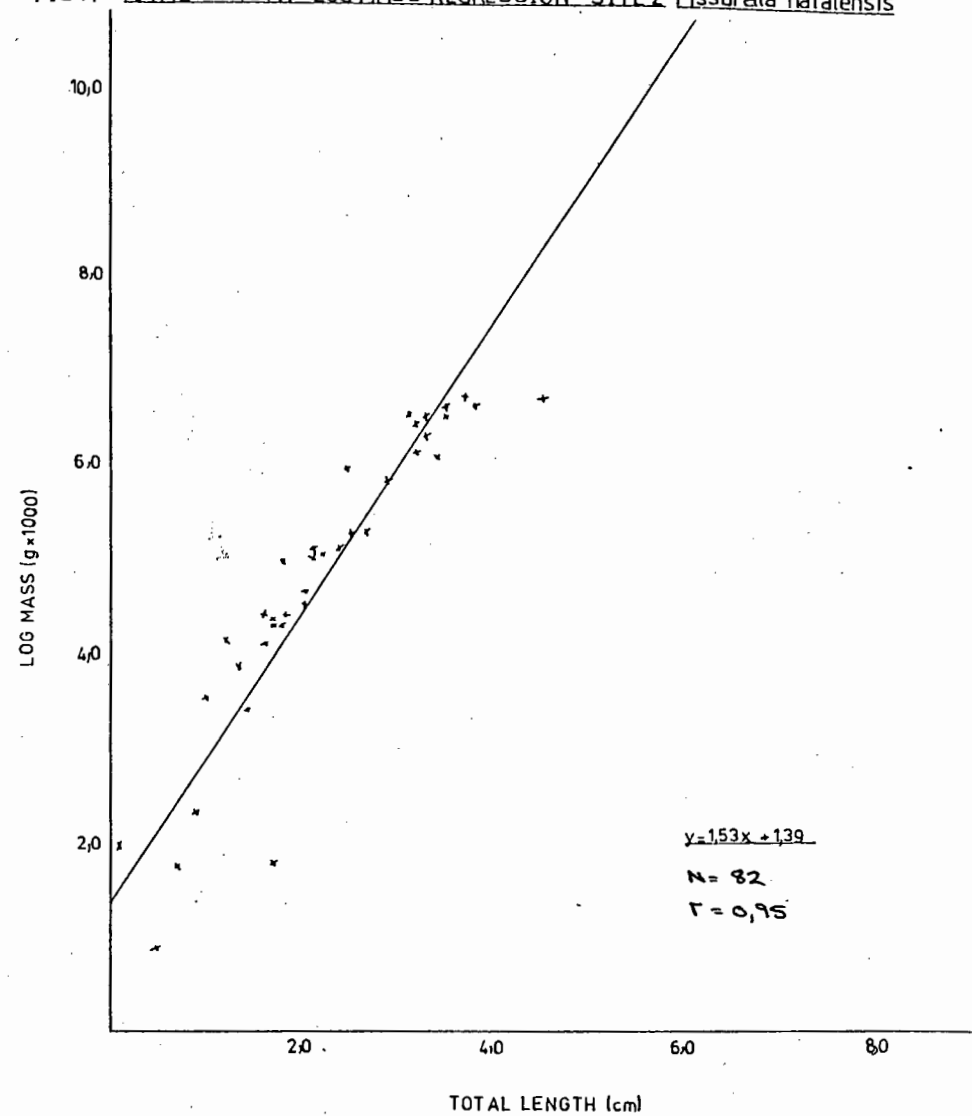


FIG 15: TOTAL LENGTH-LOG MASS REGRESSION SITE 3 *Patella granularis*

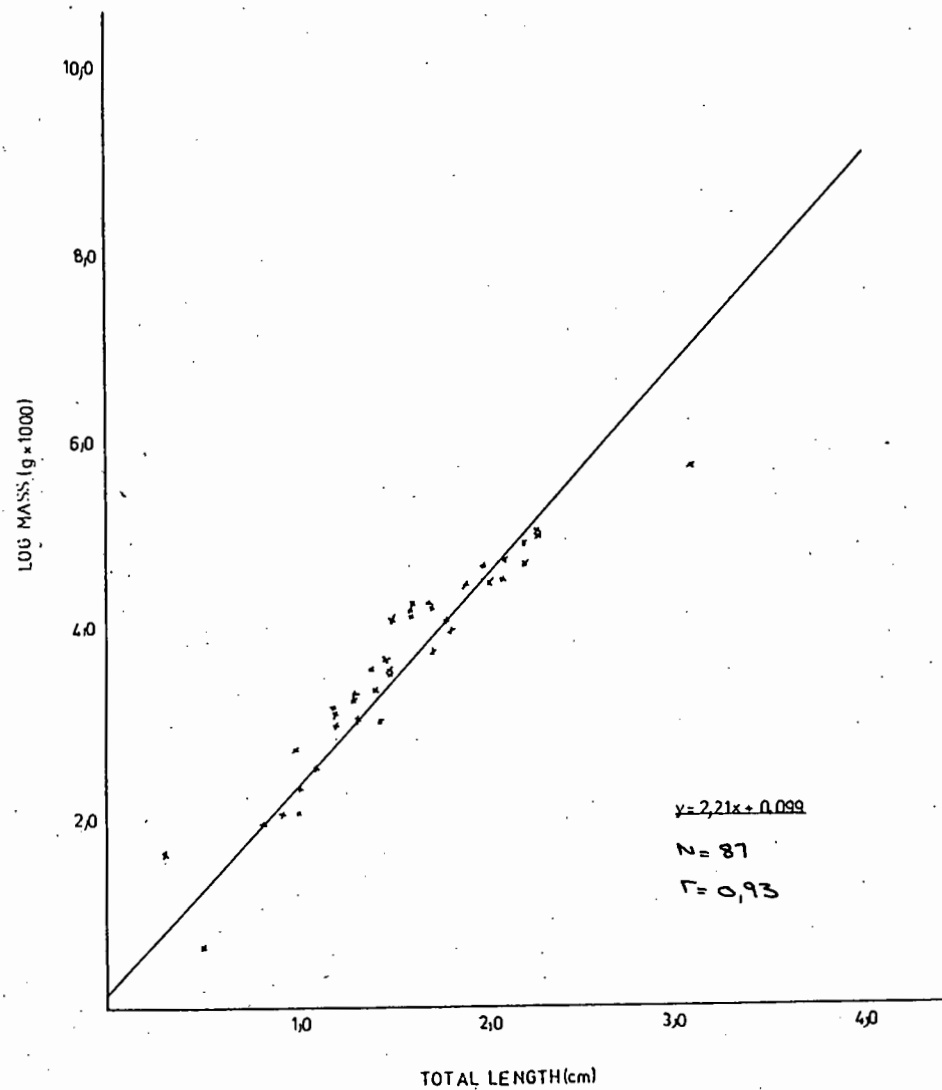


FIG 16 TOTAL LENGTH-LOG MASS REGRESSION: SITE 3 *Cellana capensis*

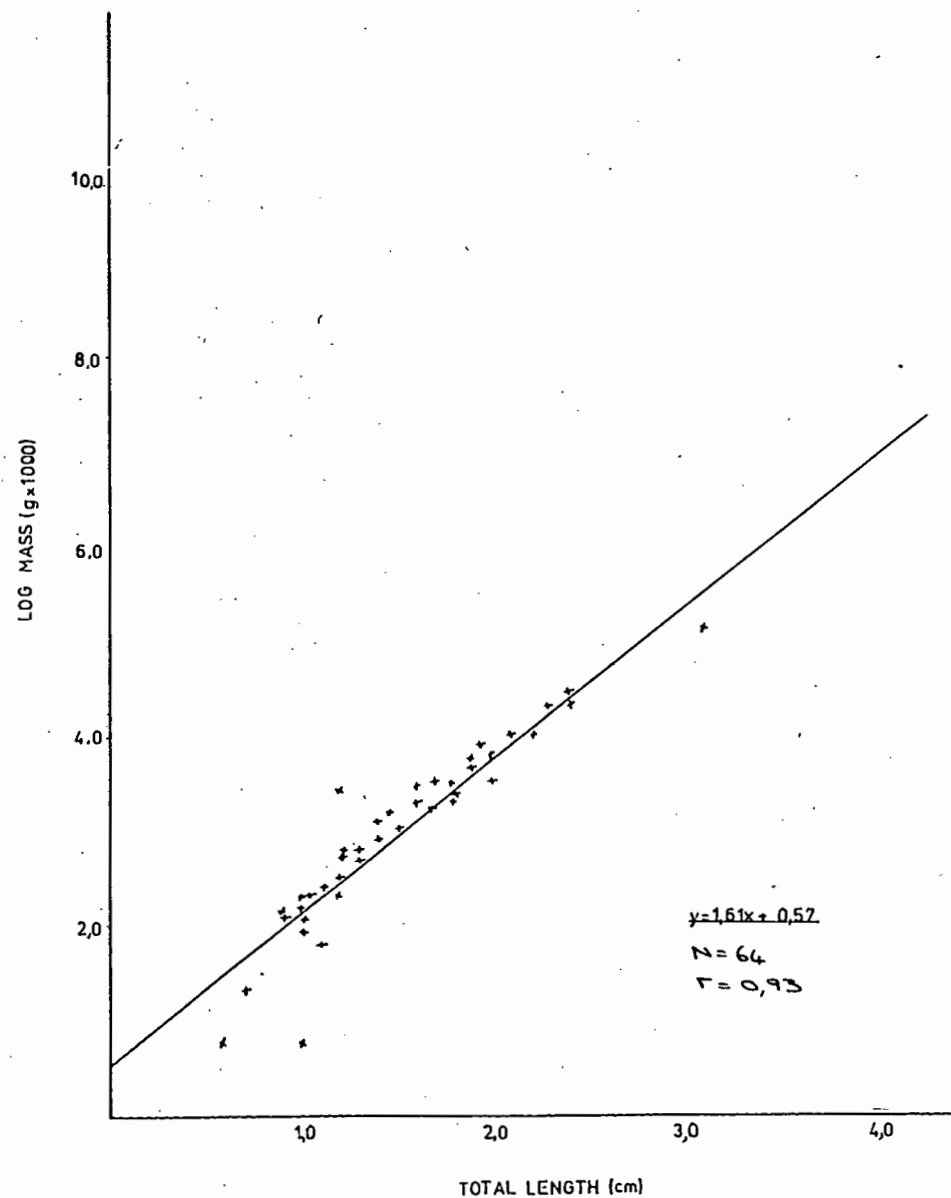


FIG 17 TOTAL LENGTH-LOG MASS REGRESSION: SITE 3 *Fissurella natalensis*

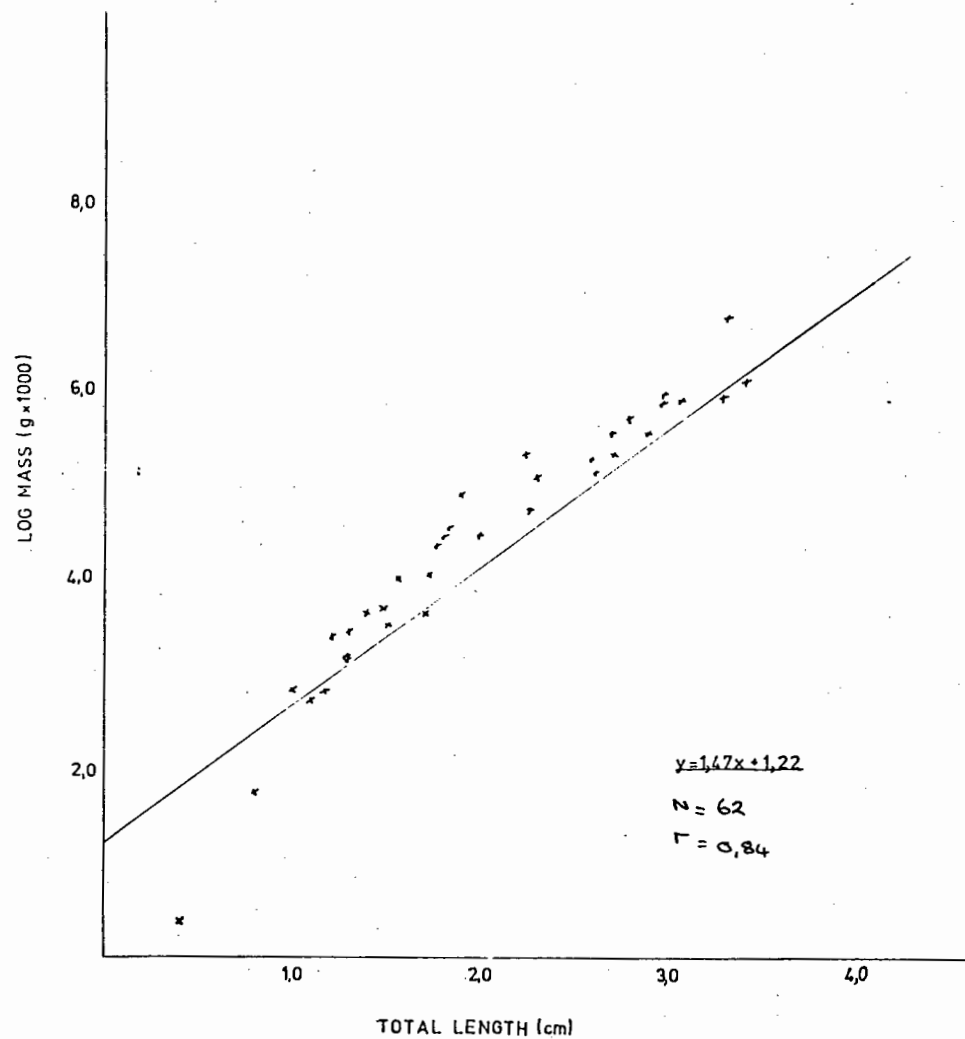


FIG 18: TOTAL LENGTH-LOG MASS REGRESSION: SITE 4 *Patella granularis*

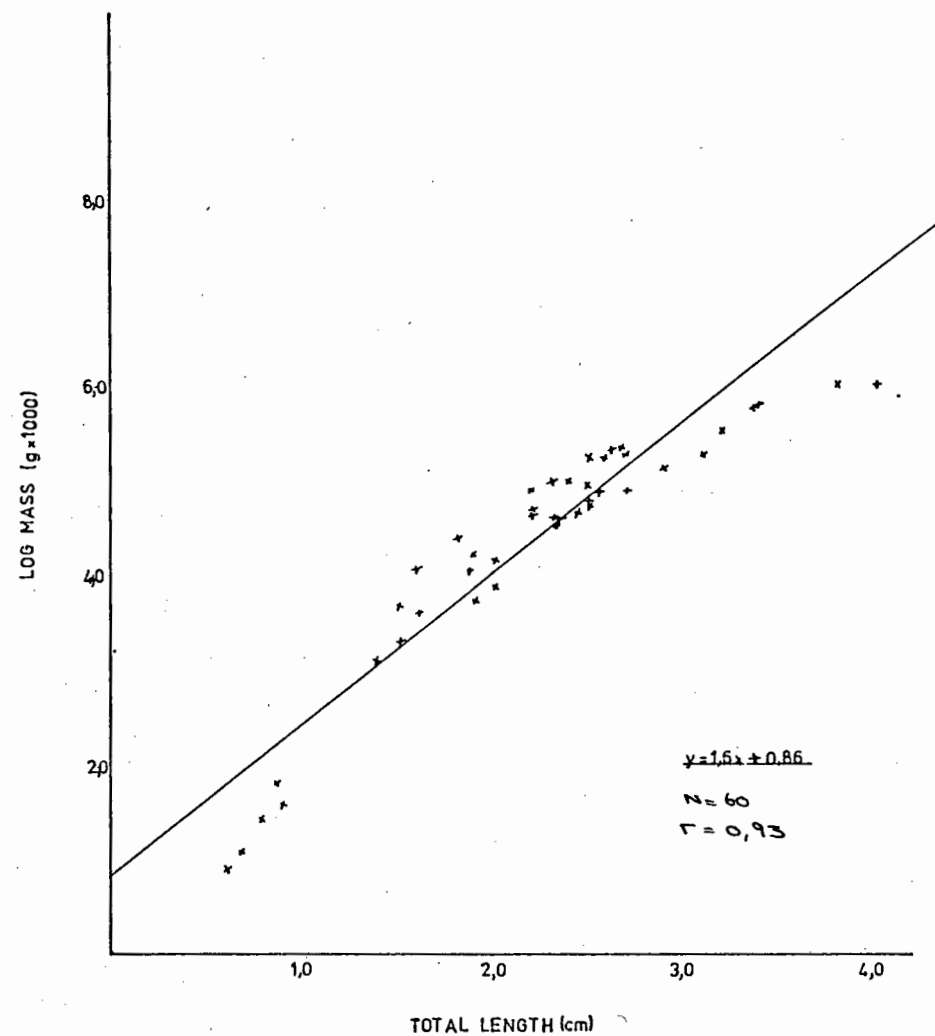


FIG 19: TOTAL LENGTH-LOG MASS REGRESSION: SITE 4 *Cellana capensis*

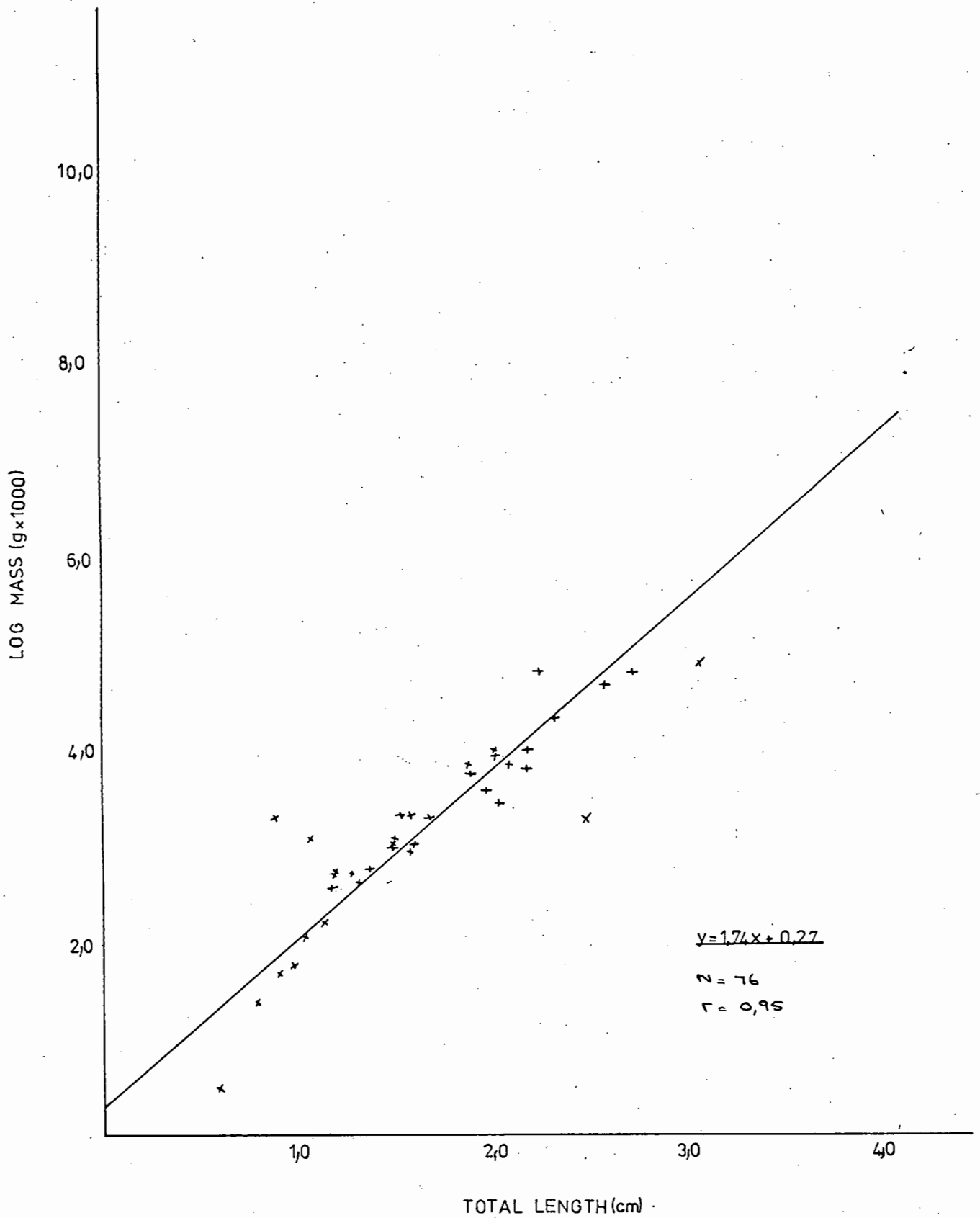


TABLE 10 : LENGTH-LOGMASS CORRELATIONS COEFFICIENTS

Species	Site	Mendwana	Dwesa	Hole in The Wall	Coffee Bay
<i>Patella granularis</i>		N = 47 r = 0,94	N = 85 r = 0,96	N = 87 r = 0,93	N = 60 r = 0,93
<i>Cellana capensis</i>		N = 76 r = 0,94	N = 38 r = 0,90	N = 64 r = 0,93	N = 76 r = 0,95
<i>Fissurella natalensis</i>		N = 58 r = 0,93	N = 82 r = 0,95	N = 62 r = 0,84	-

In the analysis of the slide data, the number of each species was recorded. In the case of sessile species, e.g. barnacles, the percentage cover was estimated.

Percentage cover was estimated in the following way:

Each block of the 25 cm² grid area was taken to represent approximately 4% cover. The proportion of each block covered by a particular species was estimated, and converted to a percentage. The totals for all the blocks were then summed to give the estimated total percentage cover of the species, for that 25 cm² area. The total percentage cover for each species was then summed to obtain the percentage cover per total area sampled.

The total length of the common limpets was obtained

by measuring the length of the projected image of the animal. This projected length was converted to the real length, using the fact that 1 block of the grid was equal to approximately 5 cm x 5 cm . A number of the sides of blocks were measured on the projected image using a ruler, and the average length was taken to equal 5 cm in 'reality'.

The dry biomass of each limpet was then obtained from the length log mass regressions.

The scraped samples were analysed in the laboratory to yield the following data: species composition, biomass (dry and ash free), and the number of each species or group of species present.

These techniques are inevitably subject to some degree of error which is unavoidable. In scraping, because of the rough methods used, animals can be lost or broken. The method is time consuming, which is an important factor to consider when working on a rocky shore, where time is limited by the tidal cycle. The result is that one is restricted to a smaller total sample size. However, this method has the advantage that much more detailed information can be obtained from the sample. Species can be positively identified and the actual biomass of an

organism or group of organisms can be obtained. One is also able to identify small organisms such as the amphipoda, polychaeta, etc. This level of identification is not possible from a slide.

The main advantage of the photographic method is that a large area can be sampled in a short time. The minimum amount of equipment is necessary, and it is a non-destructive technique. However, it has severe limitations, in that the level of analysis is restricted.

Positive identification is not always possible from a slide, as an animal may be covered by algae or obscured by another species, e.g. limpets may be unidentifiable because of barnacles settling on their shells. Biomass can only be estimated from length mass regressions. This necessitates the collection of large numbers of specimens to obtain a representative regression.

3.2.2.3 The Crassostrea Zone

This zone was sampled using the photographic technique, as outlined previously. A total of thirty-six slides was taken, effectively covering an area $2,25 \text{ m}^2$ for each site.

The quadrat was again tossed at random in this zone, the preselected 25 cm^2 corner section being

photographed after each toss. At some sites, where the crassostrea zone was very wide, a set number of steps was taken between each toss to allow for a representative sample from the zone (e.g. site 2 - Dwesa Nature Reserve).

Length mass regressions were constructed for *Crassostrea cucculata*, with surprisingly high correlations between the total length and log mass (see Table 11).

TABLE 11 : LENGTH LOG MASS CORRELATION
COEFFICIENTS FOR CRASSOSTREA CUCCULATA

Species	Site	Mendwana	Dwesa	Hole in The Wall	Coffee Bay
<i>Crassostrea cucculata</i>		N = 50 r = 0,78	N = 66 r = 0,84	N = 37 r = 0,37	N = 58 r = 0,66

It was anticipated that an estimation of biomass could be made by using the regression line. This was, however, not possible as the definition on the slides was not of sufficient quality (due to bad photography) to allow for the accurate measurement of the total length of the upper valve. The additional fact that many *C. cucculata* were found to be molded into small cracks, making it impossible to get a measure of valve length, compounded the problem.

The percentage cover of *C. cucculata* was

determined as outlined under the balanoid zone, taking one block on the 25 cm² grid area to be equal to 4% cover. In addition to percentage cover, the numbers of all species on the slides were counted, as were the number of *C. cucculata* scars.

The biomass of the limpets was obtained from the length log-mass regression for that species.

There is no data available for the autumn sample at Site Three (Hole in The Wall) in this zone, due to the fact that the researcher was using a borrowed camera and flash unit with an incorrect exposure index. This error on the part of the researcher highlights another problem with the photographic technique in that if anything goes wrong, e.g. a faulty camera or a lost spool, one's data for that period is lost completely. This is a possible disaster area, particularly if one is working to a fixed sampling programme.

3.2.2.4 The Littorina Zone

Since no exploitation actually takes place in this zone, it was not studied.

3.2.2.5 Construction of the Shoreline Profiles

A dumpy level was fixed to a tripod and set up at the top end of the transect at the top of the Littorina zone. The dumpy was then levelled with the aid of its built in spirit levels. A second person held up a ranging rod at the other end of the transect in the *Perna*-coralline algal turf zone. This person stood as far out on the rocks as it was safe to go, i.e. at the L.W.S.T. level.

The dumpy level was then aligned with the ranging rod and once this was attained the compass bearing on the dumpy level was recorded. The dumpy level remained aligned to this bearing for all subsequent measurements thus ensuring readings were taken in a straight line from one end of the transect to the other.

The height on the ranging rod observed through the dumpy level was recorded. The rod was then moved 4 m up the shore and placed in alignment with the dumpy level at which point a second reading of the height on the ranging rod was made. This procedure was continued at 4 m intervals up the shore until the entire transect had been surveyed.

If there was a vertical step in the rocks along the transect, the height of the ranging rod was recorded at the base of the step and the top of

the step, with the distance between the recording sites being carefully measured. In the case of a rock pool or small gulley, a reading was taken from the rod held in the centre of the pool and on either side of the pool or gulley, with the relevant distances being carefully measured.

Once a general survey of the transect had been made, with readings approximately every 4 m, specific readings at the point of transition between the zones on the shore were made. The distance between recording points was carefully measured. This enabled the zones to be plotted on the shoreline profile.

The height of the dumpy was fixed and measurements from this fixed level allowed measurements of variations in height along the transect to be established. A shoreline profile was then constructed, showing the variations in height from L.W.S.T. with distances along the transect (Figures 21 - 24).

The transect at each site was surveyed in the same manner during spring low tide periods.

FIG 21: SITE 1

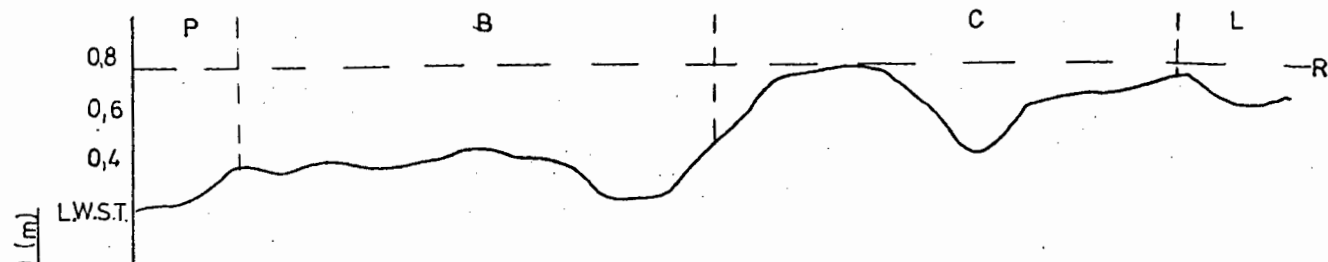


FIG 22: SITE 2

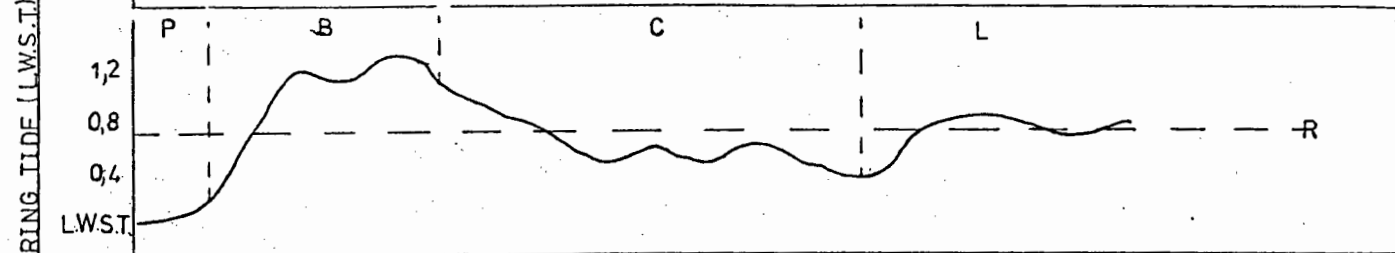


FIG 23: SITE 3

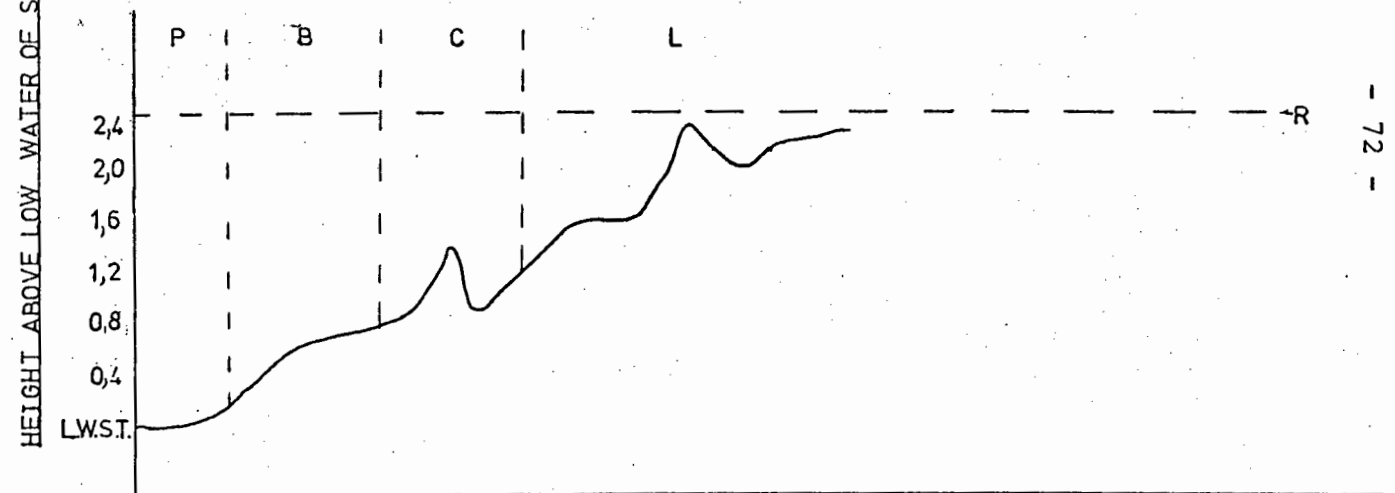


FIG 24: SITE 4

KEY:

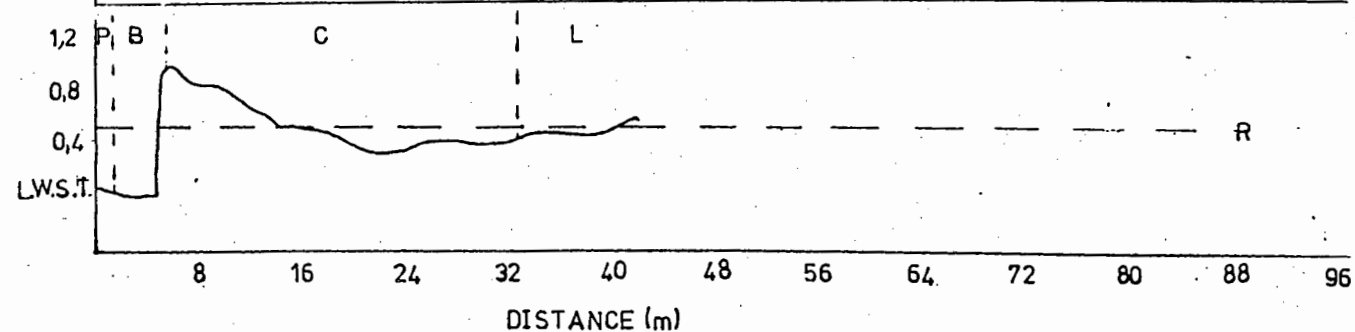
P- PERNA CORALLINE ALGAL TURF ZONE

B-BALANOID ZONE

C-CRASSOSTREA ZONE

L-LITTORINA ZONE

R-REFERENCE LEVEL



3.3 Results and Preliminary Discussion

3.3.1 Site Description

The four sites selected fall within the geological zone of the Beaufort series of mudstones, shales and sandstones. The series extends, on the Transkei coast, from Umtata Mouth in the north to Kei Mouth in the south (Anon., 1977b).

The distances between the sites are as follows:

Dwesa (site 2) and Mendwana (site 1),
distance = 10 km.

Mendwana (site 1) and Hole in The Wall
(site 3), distance = 35 km.

Hole in The Wall (site 3) and Coffee Bay
(site 4), distance = 10 km.

The large distance between Mendwana and Hole in The Wall is not desirable in a comparative study of rocky shore coasts, particularly on the Transkei coast where the transition between East and South coast species occurs (Stephenson, 1944).

The major criteria for site selection were: the amount of exploitation occurring at the site, the sites selected representing differing degrees of exploitation, and that they fall within the same geological series. However in interpreting the results, the distance between the

sites should be taken into consideration.

3.3.1.1 Dwesa site description

The transect, which was approximately 76 m in length, was located on a broad expansive shale outcrop, exposed to heavy wave action.

The shale was dark blue-black in colour, fine-grained with a polygonal surface pattern. There were numerous fine joints and cracks, but few gulleys or rock pools.

In the region of the lower balanoid there were a number of small vertical drops creating a stepped effect (see shoreline profile, Figure 22). This stepping breaks the force of the waves to some extent as evidenced by the fact that the barnacle *Octomeris angulosa* was common on the vertical faces, while the barnacle *Tetraclita serrata* was dominant on the flat rock above the steps.

3.3.1.2 Mendwana site description

The transect, approximately 92 m in length, was located near to the Bashee River mouth on an expansive mudstone outcrop exposed to heavy wave action.

The colour and texture of the rock changed from a red-brown colour, with a fairly coarse, sandy

grain in the Littorina zone, to a smooth, very fine-grained bluish-grey rock in the lower balanoid and Perna-Coralline algal turf zone.

The rock dipped quite strongly to the north, giving a marked stepped appearance on the north-south horizontal plane. The surface of the rock was every uneven, with many fine cracks, numerous fairly small rock pools and gulleys.

3.3.1.3 Hole in The Wall description

The transect, approximately 60 m in length, was located on an isolated, rocky outcrop, exposed to heavy wave action.

The rock type was mudstone of varied colour and texture. In the region of the Littorina zone the rock was blue-black in colour and fine grained. In the balanoid zone the rock colour changed to orange-grey, with a sandy texture and, finally, in the Perna-Coralline algal turf zone the rock was blue-black, fine grained and smooth.

The rock surface was uneven, irregular and strongly jointed, the joints visible as fine cracks, with sharp angles along the joint planes. There were intermittent deep rock pools with steep sides.

3.3.1.4 Coffee Bay site description

The transect, approximately 48 m long, was located on a wave cut shale platform at the base of sea cliffs rising up approximately 150 m.

There was a dolerite dyke intruding the shale, and the rock in the region of the intrusion was very fine grained and brittle. The dolerite was jointed in a regular rectangular pattern. The shale was comprised of many lamina, was fissile in nature and surface weathering had produced a polygonal pattern.

The rock colour was dark blue-black. There were no significant rock pools along the transect. In the region of the lower balanoid there was a sharp vertical drop of approximately 1,5 m (see shoreline profile, Figure 24). As at Dwesa this vertical step acts to break the force of the waves, with *Octomeris angulosa* dominant on the vertical face.

3.3.2.1 The Crassostrea zone

The total number of species present in this zone as detected from the slides, did not differ markedly between the four sites during either sampling period. The number of species and the numbers of individuals present, in fact, remained approximately comparable during autumn and winter (see Table 12).

TABLE 12 : COMPARISON OF SPECIES COMPOSITION IN THE CRASSOSTREA ZONE
(Number per square metre and percentage cover of sessile species)

SPECIES	AUTUMN SAMPLE								WINTER SAMPLE							
	SITE 1		SITE 2		SITE 3		SITE 4		SITE 1		SITE 2		SITE 3		SITE 4	
	N/m ²	P.C.	N/m ²	P.C.	N/m ²	P.C.	N/m ²	P.C.	N/m ²	P.C.	N/m ²	P.C.	N/m ²	P.C.	N/m ²	P.C.
<i>Crassostrea cucculata</i>	40	3,03	27	2,04	-	-	25	0,61	34	2,6	28	1,47	80	1,67	25	0,85
<i>Tetracilita serrata</i>	30	0,07	75	0,19	-	-	84	0,06	62	0,58	88	0,35	120	0,66	380	0,32
<i>Chthamalus dentata</i>	276	0,62	121	0,28	-	-	1161	1,78	628	2,14	248	0,58	450	0,34	1314	1,95
<i>Cellana capensis</i>	11	-	4	-	-	-	31	-	22	-	2	-	2	-	33	-
<i>Patella granularis</i>	-	-	-	-	-	-	-	-	1	-	1	-	4	-	1	-
<i>Patella concolor</i>	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Patelloida profunda</i>	-	-	-	-	-	-	1	-	-	-	-	-	6	-	-	-
<i>Siphonaria spp.</i>	37	-	2	-	-	-	1	-	25	-	1	-	1	-	5	-
<i>Fissurella mutabilis</i>	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
<i>Oxysteles spp.</i>	1	-	4	-	-	-	27	-	11	-	4	-	2	-	21	-
* <i>Littorina spp.</i>	F	-	F	-	-	-	M	-	M	-	F	-	F	-	F	-

*Both *Littorina africana knysnaensis* and *Littorina africana africana* were present at all sites. They were concentrated along cracks in the rock and around the edges of the *Crassostrea cucculata* shells. This made counting of numbers impossible and, therefore, an arbitrary measure of abundance was used, viz. Few (F), Moderate number (M) and Abundant (A).

The less common species varied in their distribution between the sites but the numbers present were small, and there was no pattern or distribution in the variation. Thus, it is tentatively concluded that the variation exhibited cannot be related to any particular factor, but reflects random sampling variation.

The numbers of *C. cucculata* differed markedly between the sites, with sites 1 and 3 having the greatest number per square metre. Site 3 has a particularly high number (80 per square metre) as compared with the other sites (see Table 13).

The greater numbers at site 1 and 3 can be attributed, to some extent, to the surface geology of the rocks at these two sites. The surfaces were very irregular allowing for more settlement sites. Many of the *C. cucculata* were found lodged in the cracks and joins of the irregular surface, whilst not many were located on flat, smooth sections of rock. Sites 2 and 4 have very similar rock surface patterns and maintain similar lower numbers of *C. cucculata*. Sites 3 and 4 also show a higher proportion of *C. cucculata* scars per square metre than site 1 or 2 (see Table 13).

An examination of the percentage cover of *C. cucculata* per square metre indicates that in both sampling periods the *C. cucculata* are smaller

at sites 3 and 4 than at sites 1 and 2 (see Table 13).

TABLE 13 : THE NUMBER, PERCENTAGE COVER AND THE
NUMBER OF SCARS OF *C. CUCCULATA*
AT EACH SITE

Site	AUTUMN SAMPLE			WINTER SAMPLE		
	Number per m ²	Percen- tage cover	Number of scars per m ²	Number per m ²	Percen- tage cover	Number of scars per m ²
1	40	3,03	1	34	2,6	3
2	27	2,04	0	28	1,47	1
3	* -	-	-	80	1,67	23
4	25	0,61	6	25	0,85	3

* See Section 3.2.2.3 for details

The dominant limpet in the *Crassostrea* zone is *Cellana capensis* with *Patella granularis* only being present in the winter samples, and then only in small numbers, e.g. 1 per square metre. However, site 3 proved exceptional with *Patella granularis* dominating in the winter sample (see Table

The unexpected high number of *Cellana capensis* at site 4, may be attributed partially to the fact that the transect extends out below sea-cliffs (see Section 3.3.1.4). These cliffs offer a degree of shade to this zone which reduces the

severe effects of dessication. This shading effect may also be the reason for the comparatively large number of barnacles at this site.

Conversely, the severe effects of dessication, compounded by the dark colour of the rock surface and the sparseness of remnant pools of water, could have been a contributory factor towards the low density per square metre of *Cellana capensis* at site 2.

TABLE 14 : THE NUMBER (per m²), MEAN TOTAL LENGTH AND DRY BIOMASS OF *CELLANA CAPENSIS* AND *PATELLA GRANULARIS*

Species	Site	AUTUMN				WINTER			
		Total Percentage cover*	Number per m ²	Mean Total Length (cm)	Dry Biomass (g/m ²)	Total Percentage cover	Number per m ²	Mean Total Length (cm)	Dry Biomass (g/m ²)
<i>Cellana capensis</i>	1	3,72	11	2,54	2,10	5,32	22	2,20	4,24
	2	2,51	4	1,38	0,17	2,42	2	1,76	0,16
	3	-	-	-	-	2,67	2	1,02	0,22
	4	2,45	31	1,63	0,82	3,12	33	1,95	1,71
<i>Patella granularis</i>	1	3,72	-	-	-	5,32	1	3,61	0,09
	2	2,51	-	-	-	2,42	1	2,08	0,04
	3	-	-	-	-	2,67	4	1,69	0,26
	4	2,45	-	-	-	3,12	1	?	0,04

* Total Percentage Cover = percentage cover of all sessile species in this zone.

3.3.2.2 The Balanoid zone

The species or group of animals occurring in this zone as determined through analysis of the scraped samples, is given in Table 15. No clear patterns corresponding to exploitation can be discerned in either the number per m^2 , or organic biomass per m^2 . Thus, it must be concluded that the variations are due in part to random sampling variations and to basic physical and biological differences between the sites.

Since the limpets are of importance in terms of this study, attention in this discussion will be focussed on them, and in particular on *Cellana capensis* and *Patella granularis*.

Table 16 summarises the basic data obtained for these two species in this zone. It is evident from these results that, although, the number per square metre and hence the dry biomass per square metre vary according to the sampling technique used (the photographic technique on average yields a lower count), the same basic trend is evident in both sets of data, for both species in the autumn and winter samples (see Table 16).

In interpreting these results one must take into consideration, among other factors, the limpet-barnacle association.

TABLE 15 : DETAILS OF SPECIES COMPOSITION IN THE BALANOID ZONE

SPECIES	AUTUMN SAMPLE								WINTER SAMPLE							
	SITE 1		SITE 2		SITE 3		SITE 4		SITE 1		SITE 2		SITE 3		SITE 4	
	N/ m ²	B (g/m ²)	N/ m ²	B (g/m ²)	N/ m ²	B (g/m ²)	N/ m ²	B (g/m ²)	N/ m ²	B (g/m ²)	N/ m ²	B (g/m ²)	N/ m ²	B (g/m ²)	N/ m ²	B (g/m ²)
<i>Tetracelita serrata</i>	3016	88,52	2976	184,58	2214	122,78	2538	68,5	4782	128,16	1920	92,94	1984	76,78	1152	66,7
<i>Octomeris angulosa</i>	504	54,9	70	3,33	1088	86	142	11,06	104	2,14	58	8,14	1178	87,2	176	5,41
<i>Chamalus dentata</i>	112	0,08	-	-	482	1,46	150	0,18	118	0,45	42	0,04	250	1,1	46	0,04
<i>Crassostrea cucullata</i>	12	4,01	4	4,56	2	1,27	-	-	6	3,0	6	1,68	4	1,86	-	-
<i>Cellana capensis</i>	64	3,21	22	2,48	76	1,12	90	3,42	66	3,4	20	2,08	62	0,9	66	1,89
<i>Patella granularis</i>	44	2,91	14	1,04	92	3,0	62	3,31	54	1,14	22	2,37	96	2,1	36	0,88
<i>Patella concolor</i>	-	-	-	-	-	-	-	-	2	0,11	-	-	-	-	-	-
<i>Patelloida profunda</i>	120	0,56	36	0,28	214	0,88	10	0,05	116	0,58	6	0,03	200	0,58	-	-
<i>Fissurella natalensis</i>	36	2,25	-	-	12	0,68	2	0,29	22	3,32	15	5,19	24	0,67	-	-
<i>Siphonaria spp.</i>	24	?	14	0,5	16	0,42	4	0,14	8	0,04	12	0,32	14	0,38	4	0,23
<i>Orxysteles tabularis</i>	232	2,63	32	0,4	114	0,5	48	0,72	134	1,77	50	1,52	46	0,36	4	0,14
<i>Orxysteles tigrina</i>	-	-	36	1,53	-	-	-	-	8	0,12	26	0,91	-	-	-	-
<i>Burnupena lagenaria</i>	-	-	-	-	6	?	2	0,14	8	0,39	14	1,81	4	0,39	-	-
<i>Nucella dubia</i>	4	0,03	2	0,03	4	0,09	4	0,07	4	0,03	8	0,17	2	0,05	-	-
<i>Littorina africana</i>	-	-	332	0,23	28	0,06	-	-	16	0,01	-	-	-	-	-	-
<i>Littorina Knysnaensis</i>	8	0,03	58		38		-	-	104	0,12	14	0,02	12	0,02	-	-
<i>Perna perna</i>	-	-	18	0,22	2	0,02	2	0,68	4	0,44	2	0,25	4	0,12	2	0,52
<i>Bivalve sp.</i>	-	-	80	0,01	24	0,02	-	-	-	-	-	-	-	-	-	-
<i>Septifer bilocularis</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	0,07
<i>Brachidontes variabilis</i>	32	0,21	-	-	4	0,10	2	0,08	-	-	-	-	-	-	-	-
<i>Cardita variegata</i>	4	0,01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
* Amphipoda	4	0,02	76	0,03	48	0,02	68	0,02	64	0,05	150	0,11	26	0,01	8	0,01
* Isopoda	48	0,14	28	0,02	18	0,02	42	0,07	60	0,13	12	0,05	36	0,07	8	0,07
** Polychaeta et al	?	57,29	?	1,41	?	1,32	122	0,33	?	2,8	?	7,45	?	3,43	?	1,31
<i>Brachyura</i>	8	0,48	4	,01	2	,00	-	-	2	0,01	-	-	-	-	6	0,12
<i>Actinaria</i>	16	0,04	-	-	16	,05	42	0,08	2	0,0	14	0,03	80	0,12	8	0,03
<i>Polyplacophora</i>	4	0,11	16	0,20	-	-	4	0,88	-	-	16	1,42	-	-	-	-
<i>Asteroidea</i>	-	-	-	-	-	-	-	-	-	-	2	0,14	-	-	-	-
<i>Pycnogonidea</i>	8	0,01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Pomatoleios kraussii</i>	?	55,79	?	18,92	?	1,09	?	2,3	?	4,69	?	14,32	?	1,10	?	1,21

* Numbers and Biomass of Amphipoda and Isopoda are subject to error and should be accepted as underestimations of the total values.

** Polychaeta, et al, includes Platyhelminthes, Nemertea, Sipunculida and Polychaeta

Key: N : Number per m²

B : Dry Organic Biomass g/m²

TABLE 16 : THE NUMBER PER METRE², MEAN TOTAL LENGTH AND DRY BIOMASS (gm²) OF
CELLANA CAPENSIS AND PATELLA GRANULARIS

SPECIES	Site	AUTUMN SAMPLE					WINTER SAMPLE				
		Photographic Technique			Scraping Technique		Photographic Technique			Scraping Technique	
		Number per m ²	Mean Total Length	Dry Biomass (g/m ²)	Number per m ²	Dry Biomass (g/m ²)	Number per m ²	Mean Total Length (cm)	Dry Biomass (g/m ²)	Number per m ²	Dry Biomass (g/m ²)
<i>Cellana capensis</i>	1	55	1,46	1,59	64	3,21	89	1,58	3,78	66	3,4
	2	19	1,80	1,47	22	2,48	10	2,20	1,26	20	2,08
	3	44	0,84	0,32	76	1,12	46	1,35	0,77	62	0,9
	4	55	1,53	2,14	90	3,42	103	1,36	2,23	66	1,89
<i>Patella granularis</i>	1	37	1,57	3,0	44	2,91	35	1,61	5,21	54	1,14
	2	9	1,70	0,58	14	1,04	13	2,33	3,95	22	2,37
	3	156	1,00	1,89	92	3,0	155	1,66	6,95	96	2,1
	4	44	1,60	2,67	62	3,31	32	1,55	1,06	36	0,88

It has been shown experimentally that limpet size and density are significantly affected by the extent of the barnacle cover on a rocky shore (Branch, 1976, Hawkins and Hartnoll, 1982).

Table 17 presents the total percentage cover of all the sessile species in this zone for each site, as well as the percentage cover of barnacles at each site.

TABLE 17 : THE TOTAL PERCENTAGE COVER AND THE PERCENTAGE COVER OF BARNACLES AT EACH SITE. (Total Percentage Cover = The percentage cover of barnacles, *Pomatoleios krausii* and algae).

	AUTUMN SAMPLE		WINTER SAMPLE	
Site	Total Percentage Cover	Percentage Cover of Barnacles	Total Percentage Cover	Percentage Cover of Barnacles
1	65,21	48,61	27,52	22,09
2	15,55	12,67	13,84	8,37
3	82,62	80,36	29,32	25,42
4	12,25	9,55	13,36	12,4

The results indicate that site 1 and site 4 support similar densities of *Cellana capensis* and, in fact, similar densities of *Patella granularis*. This is a strange result in terms of exploitation in that site 1 represents a totally protected rocky shore, while site 4

represents a heavily exploited rocky shore.

However, when one considers the difference in the percentage cover of barnacles between the two sites, the results become more understandable.

According to the limpet-barnacle association described by Branch (1976), as barnacle cover decreases so the average size and density of limpets should increase. Site 4 should, therefore, support a greater density of limpets per square metre than site 1, and the mean total length should be greater. The results indicate that this is generally true for densities per metre square, with the exception of the winter sample of *Patella granularis*. The mean total lengths of limpets at site 4 are only fractionally larger than site 1 in the autumn sample, and are actually smaller than those at site 1 in the winter sample.

The mean total lengths of limpets at site 1 are, however, depressed in comparison to the other protected site, site 2, with this depression being more pronounced during the winter sampling period.

Site 2 supports a surprisingly low density of limpets per metre squared, as this site experiences relatively little human exploitation and has a low percentage cover of barnacles. Some

other factor, therefore, must be significantly affecting limpet densities at this site. The African black oyster catcher *Haematopus moquini* is known to prey on rocky shore species. The principal components of their diet on the south-east coast being *Perna perna* and *Patella granularis* as well as other limpet species (P. Hockey, 1983).

The oyster catcher has been observed by Dr Hockey at site 2 and may, therefore, also prey on the rocks at site 1, as the two sites are in fairly close proximity. No accounts of sightings at either of the other two sites have been given. It is nevertheless possible that predation by the oyster catcher on the limpet populations may be a contributory factor to the low densities of limpets at site 2 and the comparatively low densities of *Patella granularis* at site 1. This is an idea under consideration by Dr P. Hockey of the Percy FitzPatrick Institute of African Ornithology.

The stress of dessication may also be contributory factor to the low densities of limpets at site 2.

Site 3 supports usually large numbers of *Patella granularis* considering the human exploitation and barnacle cover at this site. The mean total lengths of both *Cellana capensis* and *Patella*

granularis are depressed at this site, and this depression of total length appears more barnacle associated than exploitation associated, when one considers the difference in mean total lengths obtained in autumn and winter, and the corresponding proportion of barnacle cover recorded at the same time. The unusually high numbers of *Patella granularis* at site 3, may be partially attributed to the slope of the rocks at site 3 (refer to shoreline profile, Figure 23), as *Patella granularis* tend to be more abundant in areas where the rock slopes steeply (Anon., 1977a).

In conclusion, therefore, it would appear that the variation in the density per square metre and the mean total length of both *Cellana capensis* and *Patella granularis* between the four sites under study is due primarily to physical-biological differences, such as the limpet-barnacle association, dessication, predation and slope, rather than the effects of exploitation.

3.3.2.3 The *Perna*-Coralline Algae Turf zone

The full list of species or groups of animals occurring in this zone is given in Table 18. A comparison of the total number of species found at each site, excluding the Amphipoda, Polychaeta and other small organisms which could not be identified, reveals that the total number

TABLE 18 : COMPARISON OF SPECIES COMPOSITION BETWEEN SITES IN THE PERNA-CORALLINE ALGAL TURF ZONE (continued)

(Number per metre² and Dry organic biomass g/m²)

SPECIES	AUTUMN SAMPLE								WINTER SAMPLE							
	SITE ONE		SITE TWO		SITE THREE		SITE FOUR		SITE ONE		SITE TWO		SITE THREE		SITE FOUR	
	Number per metre ²	Dry Organic Biomass (g/m ²)	Number per metre ²	Dry Organic Biomass (g/m ²)	Number per metre ²	Dry Organic Biomass (g/m ²)	Number per metre ²	Dry Organic Biomass (g/m ²)	Number per metre ²	Dry Organic Biomass (g/m ²)	Number per metre ²	Dry Organic Biomass (g/m ²)	Number per metre ²	Dry Organic Biomass (g/m ²)	Number per metre ²	Dry Organic Biomass (g/m ²)
<i>Tetracrita serrata</i>	150	22,36	81	2,43	72	11,34	3	0,02	4	1,12	-	-	14	0,21	-	-
<i>Octomeris angulosa</i>	49	14,07	11	1,78	88	29,12	-	-	14	0,05	4	0,23	9	2,98	-	-
<i>Balanus</i> spp.	-	-	14	,54	-	-	-	-	36	0,29	7	0,22	85	2,94	-	-
<i>Patiriella exigua</i>	24	0,67	29	0,81	-	-	9	0,17	28	0,48	39	0,42	8	0,14	6	0,06
<i>Amphioplus integer</i>	9	0,01	8	0,01	-	-	7	0,01	34	0,03	1	0,00	10	0,03	46	0,03
<i>Anthothoe stimpsoni</i>	44	2,26	157	2,50	-	-	-	-	91	5,72	63	1,31	21	0,10	12	0,03
<i>Pseudactinia flagellifera</i>	16		196		-	-	-	-	52		-	-	-	-	12	
<i>Parenchinus angulosus</i>	5	0,12	20	5,24	-	-	-	-	30	5,14	22	5,81	11	0,04	8	0,04
<i>Dynamella luttoni</i>	16		20		45		116		10		68		309		416	
<i>Parisocladus perforatus</i>	18	0,05			-		-		-		-		-		-	
<i>Dynamella australis</i>	1		23		1	0,24	-		-		-	0,26	-	1,43	-	
<i>Cirolana bovina</i>	-	-	2		-		4	0,2	10	0,04	-		4		18	1,84
<i>Cymodoella pustulata</i>	-	-	-	-	6		1		-		2		3		-	
<i>Dynamella macrocephala</i>	-	-	-	-	-	-	2		2		-		-	-	12	
<i>Pycnogonum cataphractum</i>	32	0,05	3	,02	3	,01	1	0,00	-	-	5	0,01	19	0,04	16	,21
<i>Tanystylum brevipes</i>	6		10		-	-	-	-	-	-	-	-	-	-	-	
<i>Plagusia chabrus</i>	2	0,10	-	-	-	-	-	-	4		-	-	1		4	
<i>Levcisca squalina</i>	4		-	-	-	-	-	-	2	2,23	-	-	4	0,04	6	0,16
<i>Porcellana</i> sp.	-	-	-	-	-	-	-	-	4		-	-	-	-		
<i>Holothuria</i> sp.	?	47,77	?	25,71	-	-	5	4,0	?	131,46	?	7,58	-	-	7	4,9
*Amphipoda	?	0,27	?	0,20	?	0,09	?	0,32	?	0,10	?	0,10	?	,04		,21
Polychaetae et al*	?	5,76	?	3,90	?	6,23	?	,61	?	19,25	?	1,97	?	34,84	-	6,32
Total excluding Amphipoda and Polychaetae et al	35		36		24		28		34		33		29		27	

Footnotes

Polychaetae et al includes Platyhelminthes, Nemertea, Sipunculida and Polychaeta

The numbers and dry biomass of the Amphipoda are subject to error and should be accepted as underestimations of the true values.

TABLE 18 : COMPARISON OF SPECIES COMPOSITION BETWEEN SITES IN THE PERNA-CORALLINE ALGAL TURF ZONE

(Number per metre² and Dry organic biomass g/m²)

SPECIES	AUTUMN SAMPLE								WINTER SAMPLE							
	SITE ONE		SITE TWO		SITE THREE		SITE FOUR		SITE ONE		SITE TWO		SITE THREE		SITE FOUR	
	Number per metre ²	Dry Organic Biomass (g/m ²)	Number per metre ²	Dry Organic Biomass (g/m ²)	Number per metre ²	Dry Organic Biomass (g/m ²)	Number per metre ²	Dry Organic Biomass (g/m ²)	Number per metre ²	Dry Organic Biomass (g/m ²)	Number per metre ²	Dry Organic Biomass (g/m ²)	Number per metre ²	Dry Organic Biomass (g/m ²)	Number per metre ²	Dry Organic Biomass (g/m ²)
<i>Perna perna</i>	719	883,13	607	646,05	506	37,66	28	0,62	1496	961,9	406	360,94	323	57,73	18	2,08
<i>Brachidontes variabilis</i>	3	0,01	-	-	171	0,51	4	0,02	-	-	-	-	28	,26	-	-
<i>Cardita variegata</i>	-	-	1	0,01	-	-	-	-	-	-	-	-	-	-	-	-
<i>Gregariella simplicifilis</i>	1	0,00	7	0,0	8	0,06	31	2,09	-	-	4	0,11	-	-	22	0,52
<i>Septifer bilocularis</i>	1	0,00	-	-	-	-	-	-	-	-	-	0,36	-	-	-	-
<i>Oxystele tabularis</i>	249	11,05	45	3,02	59	2,52	9	0,16	90	2,22	65	4,61	29	0,59	6	0,01
<i>Oxystele sinensis</i>	-	-	1	0,06	-	-	-	-	-	-	1	0,19	-	-	-	-
<i>Oxystele tigrina</i>	-	-	-	-	-	-	-	-	-	-	4	0,23	-	-	-	-
<i>Burnupena lagenaria</i>	53	9,6	13	1,45	15	2,08	1	0,09	40	7,77	5	5,88	3	0,13	22	1,34
<i>Burnupena pubescens</i>	8	0,09	5	0,01	-	-	-	-	10	0,74	-	-	-	-	-	-
<i>Thais capensis</i>	5	1,69	4	3,59	-	-	-	-	24	7,56	-	-	-	-	-	-
<i>Tricholia kochi</i>	3	0,01	12	0,04	1	0,00	2	0,01	22	0,16	6	0,01	15	0,02	20	0,04
<i>Nucella dubia</i>	-	-	12	0,23	2	0,03	11	0,42	-	-	-	-	-	-	-	-
<i>Turbo cidaris natalensis</i>	-	-	-	-	1	0,00	1	0,02	-	-	1	0,01	-	-	2	0,01
<i>Patella longicosta</i>	64	11,25	28	1,86	14	1,44	1	0,09	48	5,34	19	2,08	33	6,43	-	-
<i>Patella oculus</i>	4	1,97	17	1,75	-	-	-	-	2	0,26	11	3,65	-	-	-	-
<i>Patella barbara</i>	2	0,08	3	1,03	6	0,33	-	-	-	-	5	3,06	6	0,94	-	-
<i>Patella miniata</i>	-	-	2	4,01	-	-	-	-	2	0,64	1	0,39	2	0,42	-	-
<i>Patella cochlear</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Patella concolor</i>	-	-	-	-	-	-	2	0,42	8	0,26	25	1,35	-	-	-	-
<i>Patella granularis</i>	21	1,01	42	2,54	28	1,10	1	0,06	-	-	1	0,08	2	0,70	-	-
<i>Patella exvagia</i>	1	4,05	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Cellana capensis</i>	-	-	-	-	1	0,01	1	0,00	2	0,06	2	0,03	4	0,02	-	-
<i>Helcion pruinosus</i>	1	0,04	-	-	-	-	-	-	24	0,66	9	0,41	19	1,96	14	0,03
<i>Fissurella natalensis</i>	33	1,26	45	1,10	59	9,24	6	0,55	-	-	-	-	-	-	-	-
<i>Fissurella mutabilis</i>	-	-	-	-	-	-	-	-	8	0,30	-	-	12	0,08	-	-
<i>Amblychilepas scutellum</i>	-	-	-	-	6	0,1	1	0,03	28	0,66	5	0,09	-	-	10	0,33
<i>Siphonaria spp.</i>	57	2,81	9	0,30	19	0,6	6	0,41	18	10,48	12	8,67	-	-	-	-
<i>Haliotis spadicea</i>	8	6,87	?	?	-	-	-	-	86	2,62	95	4,1	3	0,47	-	-
<i>Acanthochiton garnoti</i>	4	,04	9		9		101		-	-	22		15	0,40	66	
<i>Notoplax productus</i>	1		-		-		5		-	-	1	0,64	2		4	0,28
<i>Isochiton oniscus</i>	-	-	2	,09	-	0,24	-	0,54	4		3		-	-	4	
<i>Chaetopleura pertusus</i>	-	-	2		3	-	-		-	-	0		-	-	2	
<i>Onithochiton literatus</i>	-	-	-		2		1		4	0,02	1		-	-	-	
<i>Chiton sp.</i>	-	-	22		-		29		2		-	-	-	-	-	-

of species present is greater at the protected sites, 1 and 2, than at the exploited sites 3 and 4. This finding contrasts with the finding by Siegfried (1977), that an exploited area contained more animal species than a protected area. It is suggested that exploitation of the rocky shore results in a wider range of available habitats. (Siegfried, 1977, p 9).

Figure 25, however, indicates that in the exploited sites investigated in this study, Coralline algal turf is gradually taking over as the degree of exploitation increases, possibly decreasing available habitats. For example, many species, such as the *Holothuria* and *Actinaria* were found living among the byssal threads of *Perna perna*. The removal of *Perna perna*, therefore, constitutes a loss in habitat for these species.

Since the species list is very complex, attention will be focussed primarily on the species harvested by the local tribespeople.

Table 19 summarises the data on the number, biomass and mean total length of the most heavily exploited species. The relationship between numbers per square metre and dry biomass is shown diagrammatically in Figures 26 to 30.

TABLE 19 : THE NUMBER, BIOMASS AND MEAN TOTAL LENGTH OF THE MOST HEAVILY EXPLOITED SPECIES OF THE PERNA-CORALLINE ALGAL TURF ZONE

SPECIES		AUTUMN				WINTER			
		Site 1	Site 2	Site 3	Site 4	Site 1	Site 2	Site 3	Site 4
PERNA PERNA	Number/m ²	958	607	506	19	1496	406	323	18
	Dry Biomass (g/m ²)	883,13	646,05	37,66	0,62	961,90	360,94	57,73	2,08
	Mean Total Length (cm)	5,26		2,78	1,43	6,11	5,36	3,5	3,08
	Standard Deviation (cm)	3,34		0,70		3,65	3,22	0,60	1,42
PATELLA LONGICOSTA	Number/m ²	64	28	14	1	48	19	33	-
	Dry Biomass (g/m ²)	11,25	1,86	1,44	0,09	5,34	2,08	6,43	-
	Mean Total Length (cm)	2,76	1,95	2,62	2,5	2,26	2,32	2,94	-
	Standard Deviation (cm)	1,02	0,76	0,71	-	1,17	1,06	1,07	-
PATELLA OCULUS	Number/m ²	4	17	-	-	2	16	-	-
	Dry Biomass (g/m ²)	1,97	1,75	-	-	0,26	3,64	-	-
	Mean Total Length (cm)	4,15	2,38	-	-	2,95	3,08	-	-
	Standard Deviation (cm)	1,60	0,93	-	-	-	1,46	-	-
PATELLA BARBARA	Number/m ²	2	3	5	-	-	5	6	-
	Dry Biomass (g/m ²)	0,08	1,03	0,33	-	-	3,06	0,94	-
	Mean Total Length (cm)	1,50	3,62	1,82	-	-	5,56	2,33	-
	Standard Deviation (cm)	-	1,59	0,37	-	-	0,70	1,45	-
PATELLA MINIATA	Number/m ²	-	2	-	-	2	1	2	-
	Dry Biomass (g/m ²)	-	4,01	-	-	0,64	0,99	0,42	-
	Mean Total Length (cm)	-	7,70	-	-	3,80	6,65	3,55	-
	Standard Deviation (cm)	-	-	-	-	-	-	0,21	-
HALIOTIS SPADICEA	Number/m ²	8	5	-	-	18	12	-	-
	Dry Biomass (g/m ²)	6,87	6,39	-	-	10,48	8,69	-	-
	Mean Total Length (cm)	3,46	3,64	-	-	2,98	2,67	-	-
	Standard Deviation (cm)	0,77	0,82	-	-	0,93	1,68	-	-

AUTUMN SAMPLE

WINTER SAMPLE

SITE 1 SITE 2 SITE 3 SITE 4 SITE 1 SITE 2 SITE 3 SITE 4

FIG 25: THE RELATIVE PERCENTAGE COVER OF *Perna perna* AND

CORALLINE ALGAL TURF

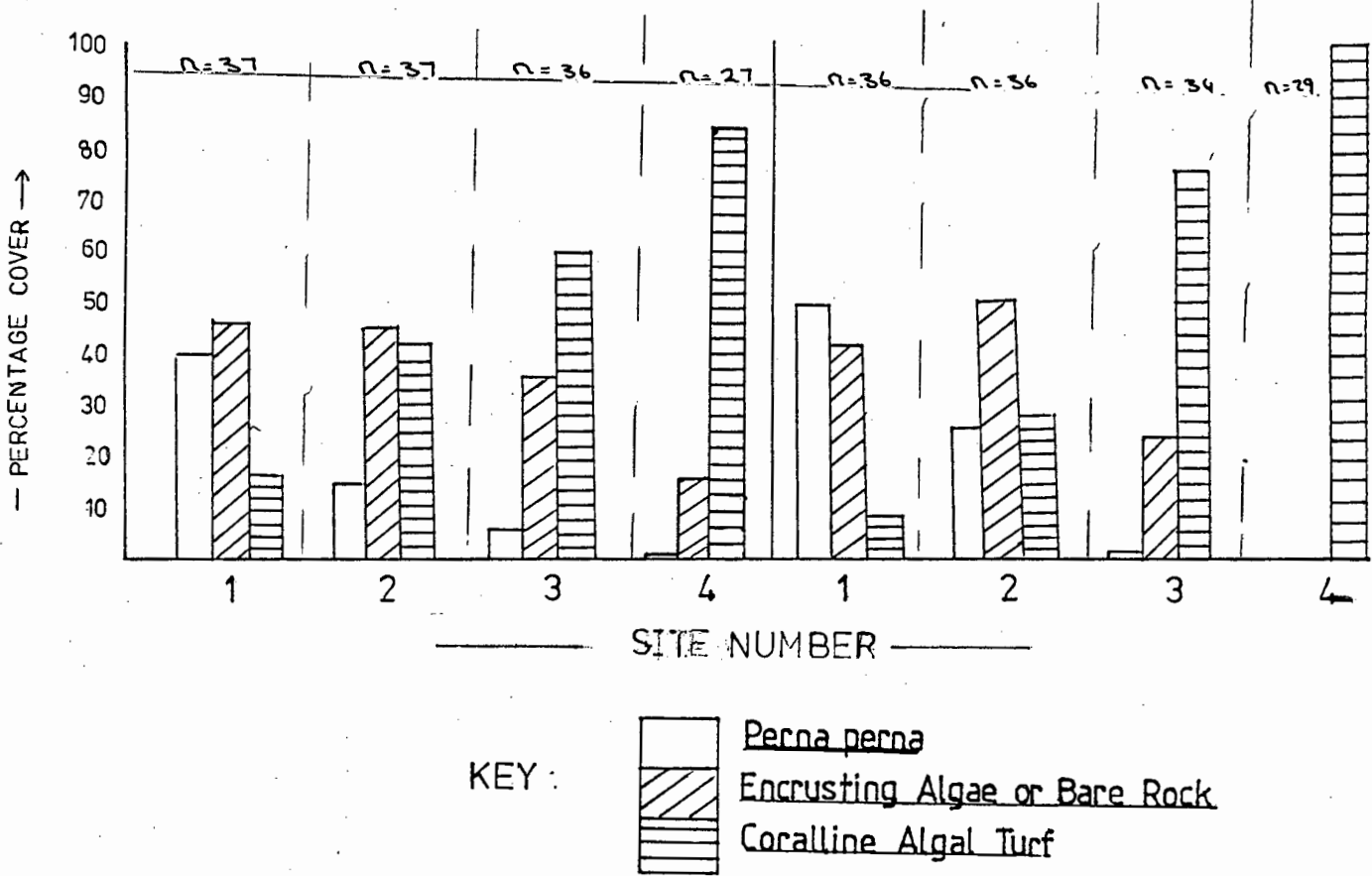
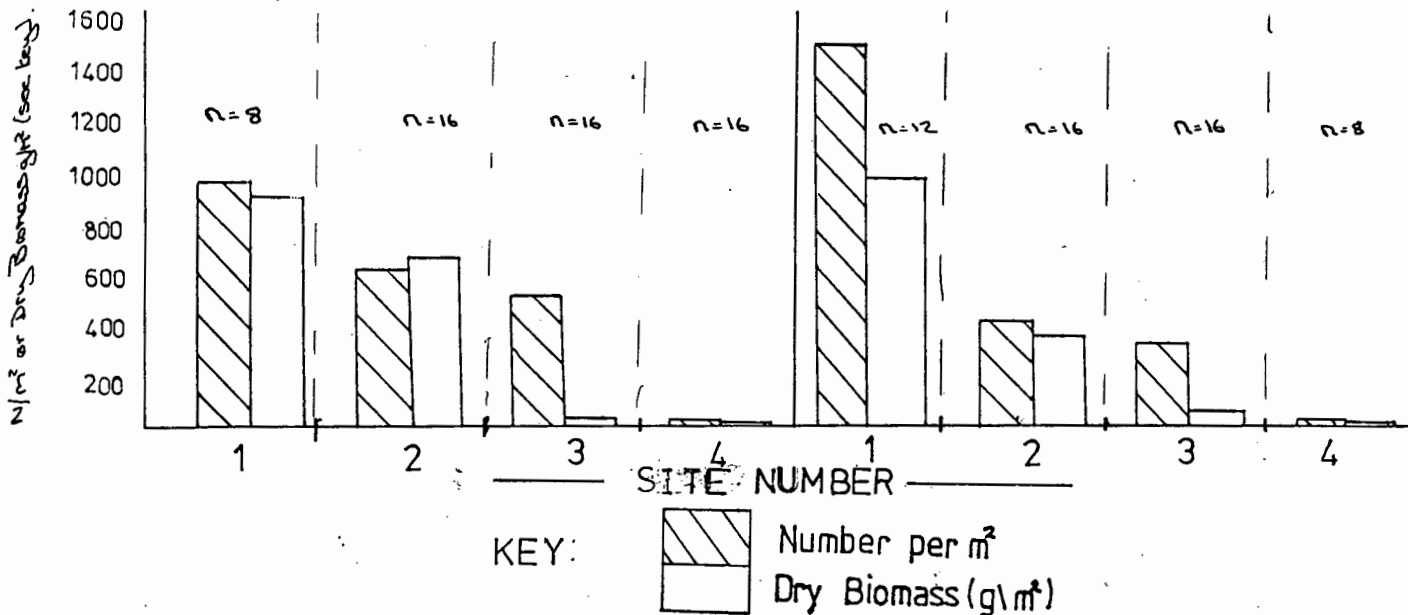


FIG 26-30. THE NUMBER AND BIOMASS OF EXPLOITED SPECIES

FIG 26 *Perna perna*



AUTUMN SAMPLE

WINTER SAMPLE

SITE 1

SITE 2

SITE 3

SITE 4

SITE 1

SITE 2

SITE 3

SITE 4

FIG 27 *Patella miniata*

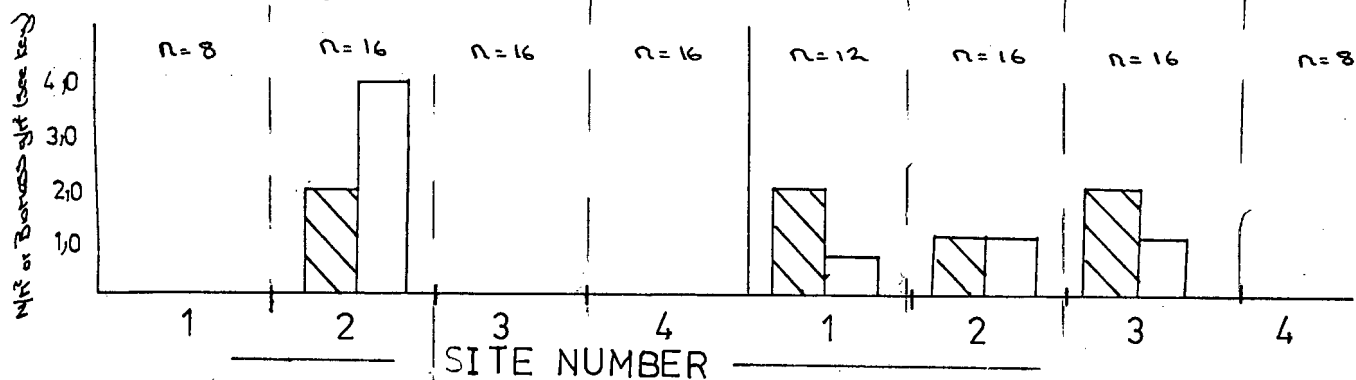


FIG 28 *Patella orculus*

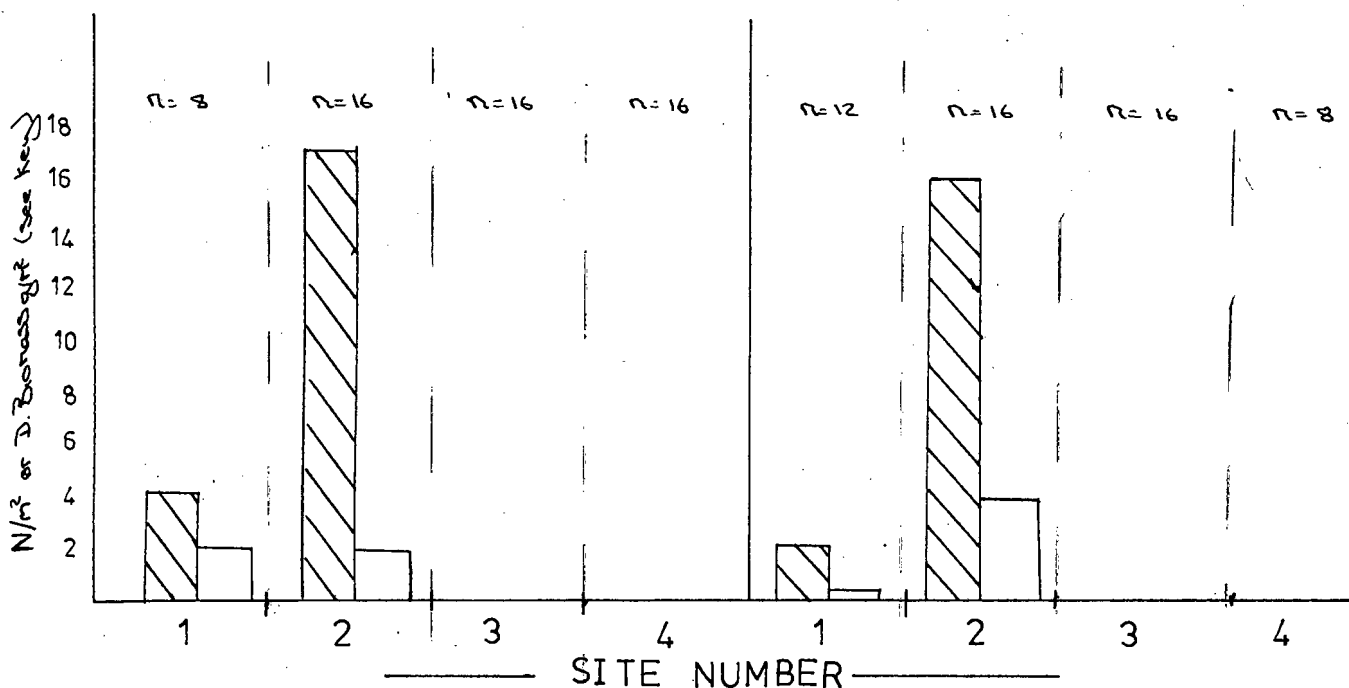
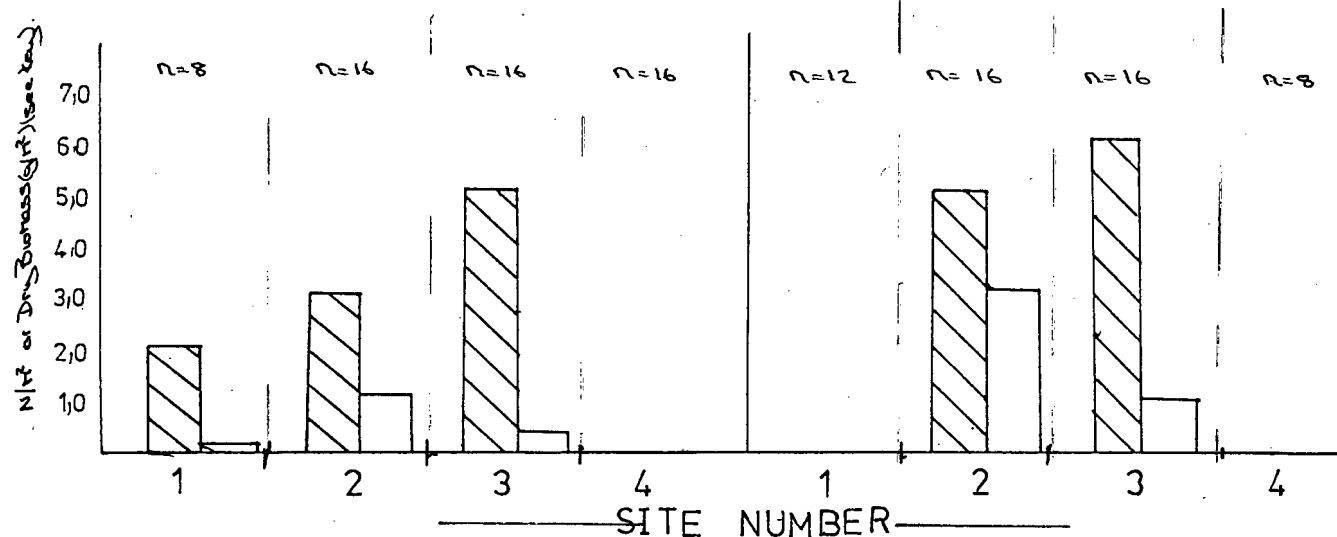


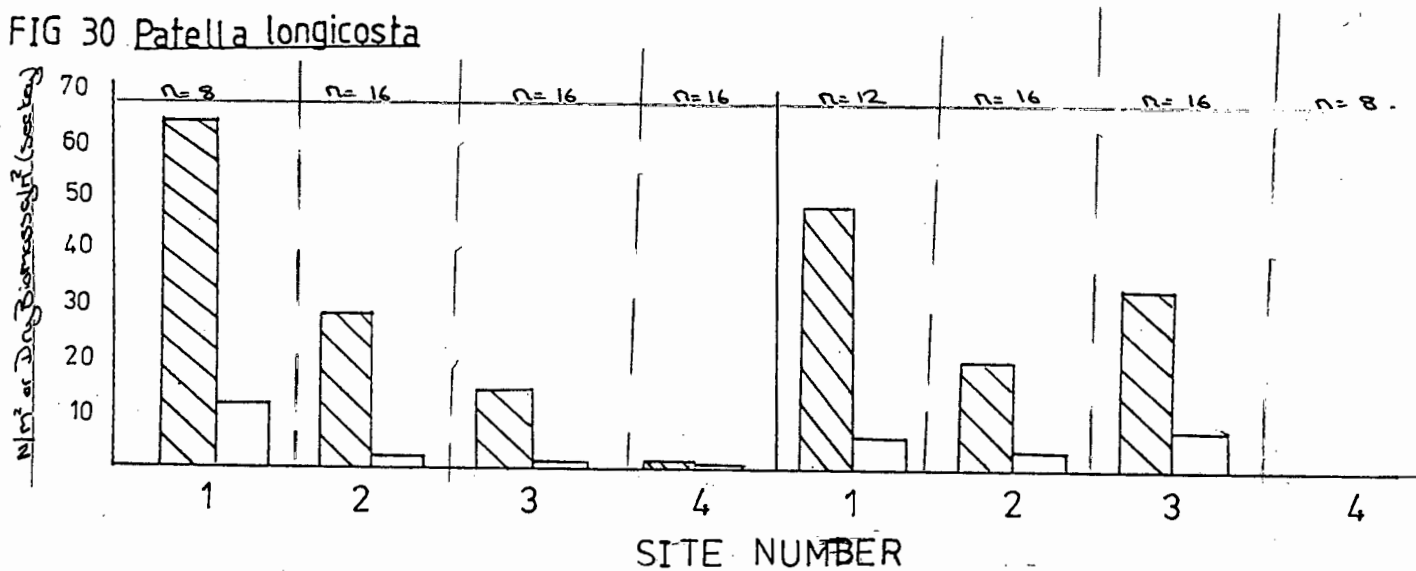
FIG 29 *Patella barbara*



AUTUMN SAMPLE

WINTER SAMPLE

SITE 1 SITE 2 SITE 3 SITE 4 SITE 1 SITE 2 SITE 3 SITE 4

FIG 30 *Patella longicosta*

There is a clear decrease in the number per m^2 of *Perna perna* from the protected to the exploited sites, with corresponding increase in coralline algal turf. Since *Perna perna* is the most heavily exploited species, it can be safely assumed that the primary reason for this reduction in numbers is human consumption. More dramatic, however, than this decline in numbers is the decline in average size. This relationship is diagrammatically presented in Figure 26. The size frequency distributions for *Perna perna* (Figures 33 to 38), clearly reveal that more mature, stable communities of *Perna perna* are found at the protected sites, while the exploited site supports a relatively young community with average size of 2,78 cm in the autumn sample and 3,5 cm in the winter sample. This will be discussed at greater depth in Chapter Four.

AUTUMN SAMPLE

FIG 33 SITE 1

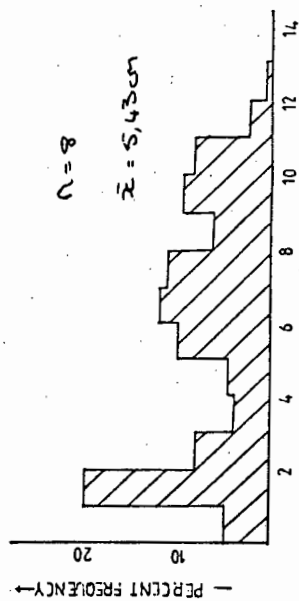


FIG 34 SITE 2

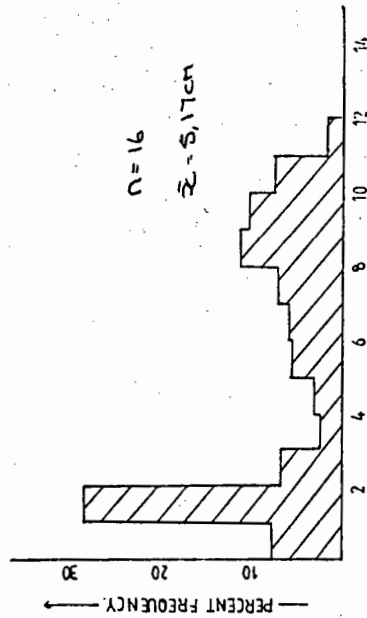
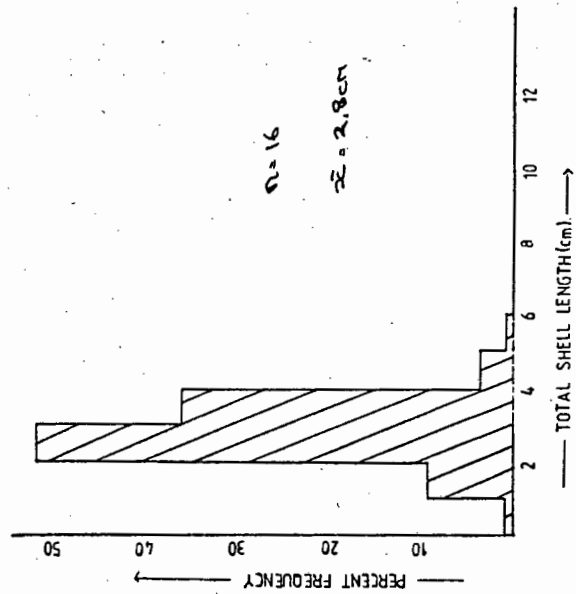


FIG 35 SITE 3



WINTER SAMPLE

FIG 36 SITE 1

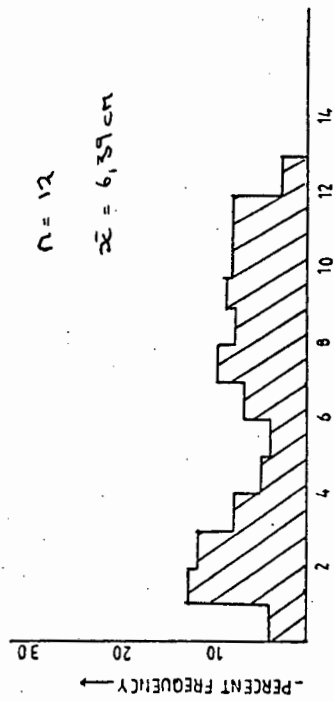


FIG 37 SITE 2

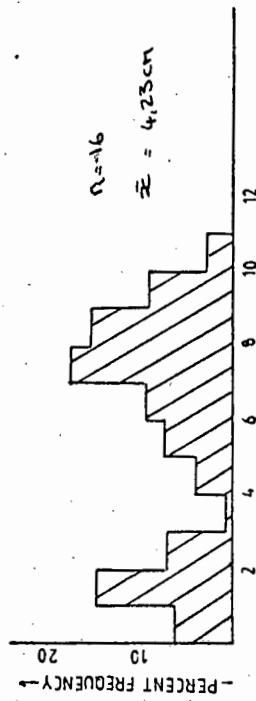
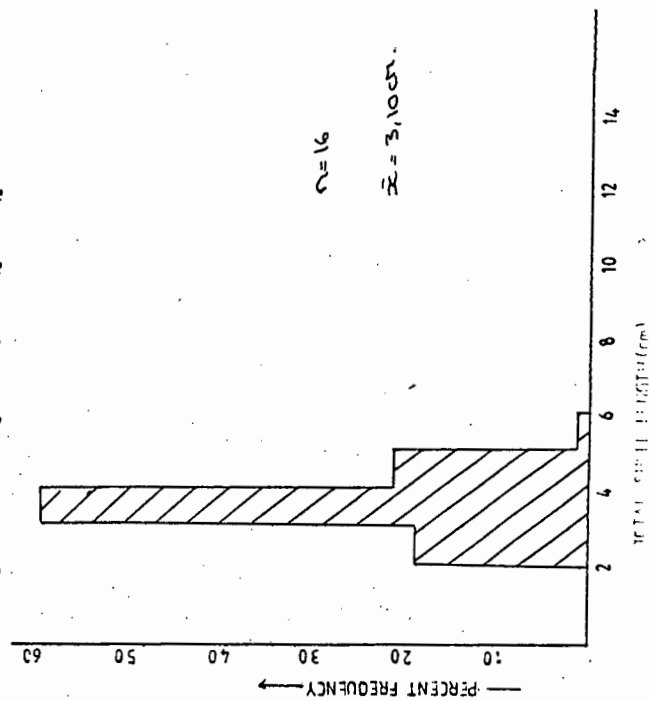


FIG 38 SITE 3



The number and average sizes of limpets in this zone vary considerably between the sites. The dominant limpet of this zone being *Patella longicosta*. The apparent absence of a species such as *Patella miniata* from a particular site highlights a possible sampling error, in that the area scraped may not have been large enough to adequately represent these species, e.g. it is known from the analysis of the meal remains given in Chapter Two that *Patella miniata* did in fact occur at site 3 in fairly considerable numbers, yet it is not represented significantly in the random sample.

The variation in the limpet communities may be partially a product of available space, which is related to some extent to exploitation and will be dicussed in depth in Chapter Four.

CHAPTER FOUR - THE EFFECT OF EXPLOITATION
ON THE ROCKY SHORE BIOTIC
COMMUNITIES

4.1 Introduction

The abundance and average size of individuals of any species in a rocky shore community is influenced by a variety of environmental factors. This induces a natural variability between different sites. It is, therefore, difficult to draw conclusions regarding the influence of any particular factor. This difficulty is compounded in comparisons between sites where no measure of the original nature of the systems is available.

In the absence of such background information, a system of continuous monitoring of sites over a long period of time becomes the most reliable method of studying community changes. The effects of various factors on community change can then be investigated, but it is important to monitor physical environmental factors as well as the extent of any human interference simultaneously, if conclusions regarding the effects of these influences are to be drawn.

The frame of reference and scope of this study did not permit such long term investigations. However, aspects of both the nature and extent of human exploitation and the effects of this exploitation on the biological systems were investigated as intensively as possible in the time available.

A basic shortcoming in the biological sampling procedure (refer to Section 3.2.2.1) prevented meaningful statistical analysis of the results, as reliable measures of sampling variation were not possible from two samples.

The statistical tests of significant difference for non-parametric statistics lack power and they cannot incorporate multispecies and multifactorial information.

Statistical tests have been developed to deal with multispecies data (Field, et al., 1982), however, the sampling procedure used and the depth of analysis in this study was not sufficient to allow the power and scope of these tests to be applied. Thus, statistical analysis of the results had to be limited to measures of central tendency.

With these limitations in view, however, an attempt has been made to link the information obtained on the nature of human exploitation with the findings of the biological surveys in a logical manner, ^{AND WILL BE DISCUSSED UNDER THE HEADINGS OF THE VARIOUS ZONES.} The conclusions that are reached must, therefore, be viewed in the light of the limited scope of this study, and are not to be accepted as statistically proven.

4.2 The Crassostrea Zone

The crassostrea zone is not heavily exploited by the indigenous people. *Crassostrea cucculata* are eaten raw by tribeswomen as they pause during collecting and during the washing and sorting phases of the harvesting procedure. Bigalke (1973) has recorded *C. cucculata* shells

in meal remains, but they form only a tiny percentage of the total harvest. Limpets in this and the balanoid zones are harvested for use as crayfish bait.

The results of the biological surveys indicate that the numbers of *C. cucculata* differ markedly between the four sites, with sites 1 and 3 having the greatest number per square metre. Site 3 has a particularly high number - 80 per square metre when compared with the other sites (see Table 13, Chapter 3). This high density can be partly attributed to the surface structure of the rocks at this site (refer to Section 3.3.2.1).

The indications that exploitation may be affecting the number of *C. cucculata* are:

- (i) According to Stephenson (1944) the numbers of *C. cucculata* decrease from Natal to East London. However, despite the distance between sites 1 and 2, and sites 3 and 4, sites 1 and 2 have more *C. cucculata* per square metre than site 4.
- (ii) The increase in number of *C. cucculata* per square metre, from that recorded by Siegfried (ed.) (1977) at site 2, to the number per square metre recorded in this study. Although sampling techniques may have varied, site 2 and the site studied by Siegfried (ed.) (1977), are in close proximity to one another and it is possible that the increase in numbers

recorded could be due to decreasing exploitation.

The evidence regarding the effect on number per square metre is, however, inconclusive at this stage.

The difference in average size as measured by the difference in percentage cover appears more clearly related to exploitation. Average size decreases with increasing exploitation (see Table 13, Chapter 3).

There is no clear indication from the biological surveys that exploitation is having any effect on the limpets in this zone. Site 4 supports the highest density of *Cellana capensis* in both the autumn and winter samples, followed by site 1. Site 2 supports a surprisingly low density of limpets per square metre (see Table 14, Chapter 3).

According to the data available, the variation in the species present or absent cannot in any way be linked with the effects of exploitation in this zone.

4.3. The Balanoid Zone

The balanoid zone is not heavily exploited by the local tribespeople as most harvesting is done during spring tide periods and is concentrated in the lower *Perna*-coralline algal turf zone.

Cellana capensis and *Patella granularis*, the dominant limpets in this zone, are, however, both exploited species. Bigalke (1973) recorded unusually high numbers of *Cellana capensis* in meal remains, although such high numbers have not been found in subsequent research. The present data does, however, suggest that *Cellana capensis* is more heavily exploited than *Patella granularis*.

Neither of these species were found in the meal remains taken from Hole in The Wall, which had been collected mainly in the lowest zone.

The results of the biological survey indicate that exploitation is not having any dramatic effect on these two species, but rather the variation in numbers and mean total length are a function primary of the physical-biological differences between the sites, as discussed in Chapter Three.

This finding is contrary to the suggestions advanced by Branch (1975a) that human consumption of molluscs has led to a dramatic reduction in densities and average sizes of some species. Particular mention is made of *Patella concolor* and *Cellana capensis*. He suggests

that a reason might be that as they dominate in the balanoid zone, they are accessible to all low tides.

His conclusion that the average size of *Patella concolor* has been reduced considerably by human consumption is unconvincing. It is stated that there had been an average reduction in the maximum size of this species of 15 to 20 mm over a three to five year period. However, this reduction in maximum size was evident at a number of sites, including those where no human consumption of the species is known to take place, such as Haga Haga and Gonubie (Branch, 1975a, p 81).

The available evidence from meal remains in the Transkei (Bigalke, 1973, and Siegfried (ed.) 1977) and the observations made in this study, suggest that this species is not heavily exploited, although it is accessible at all low tides.

It is, therefore, tentatively suggested that human exploitation in this zone is not having any dramatic effects on the biotic communities in this zone.

4.4 The *Perna*-Coralline Algal Turf Zone

The brown mussel, *Perna perna*, has for a long time dominated the collections of shellfish harvesters (Derricourt, 1977, and Cronin, 1982). They still form the major component of shellfish collections today.

The number of mussels that are collected in a single two hour period clearly reflects the intensity of this exploitation (see Section 2.3.1.4). Furthermore, when we consider that up to 316 women have been observed collecting on a two kilometre stretch of coastline during a single spring low tide, the degree of exploitation of *Perna perna* in Transkei is evident.

The direct effects of this exploitation on the mussel population are clearly discernible in the results of the biological surveys.

The most obvious effect is a decrease in the percentage cover of *Perna perna* with increasing exploitation, and coupled with this, an increase in the percentage cover of coralline algal turf (see Figure 25). Mussels are filter feeders and can, by effectively filtering algal ~~se~~orelings from the water, prevent algae settling where they dominate the shore. Recently, experiments have shown that the removal of mussels from an area results in dense algal mats forming (Branch, 1981, p.38^{*}). Thus, where exploitation is the most intense, i.e. at site 4, coralline algal turf completely dominates the lower shore.

(Branch G.M. & Branch M., 1981, p.38)

This dominance of coralline algal turf retards the recruitment of mussel larvae and hence the recovery of the mussel population, since larval mussels are stimulated to settle by existing mussel beds (Anon., 1977a). Areas totally scraped of mussels have been found in Natal to take up to four years to recover (Anon., 1977a).

It is very seldom, however, that the indigenous people will strip an entire area of mussels, rather they harvest fairly selectively, leaving smaller clumps of mussels in patches along the lower shore. This is important as it facilitates the settlement of mussel larvae, replenishing mussel stocks at a faster rate than if an entire area was scraped free of mussels.

The fact that the local tribespeople are selective (where possible) in their harvesting of mussels, is evident from a comparison of the size frequency distributions of harvested *Perna perna*, and of a random sample of *Perna perna* from the same area of rocky shore at site 3 (see Figures 2, 35 and 38).

The local tribespeople tend to harvest larger specimens of modal length between 4 cm and 5 cm, while the modal length of the random samples is approximately 3 cm.

The size range of mussels from which the local tribespeople can select has itself clearly been affected by exploitation over the year. Consider Figures 33 to 38 in Chapter Three. The size range and hence the age

SIZE FREQUENCY DISTRIBUTIONS OF *Perna perna*

AT SITE 3.

FIG 2.

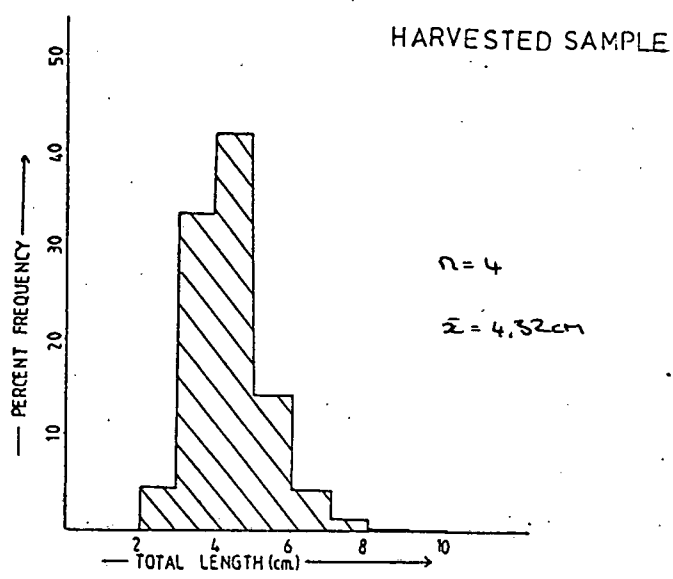


FIG 35.

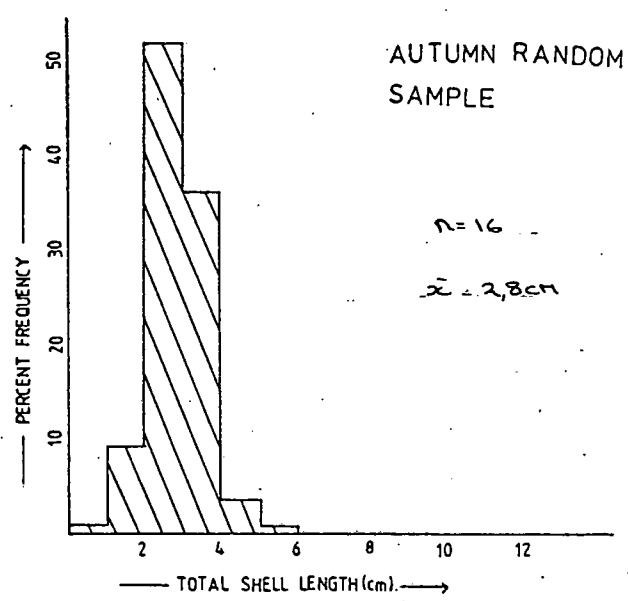
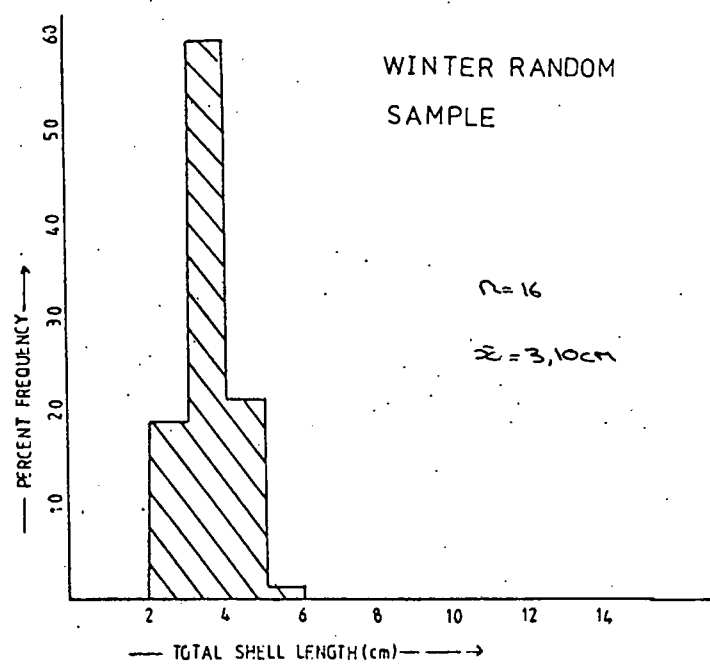


FIG 38



structure of the mussel population at sites 1 and 2 reflect more balanced mature communities of *Perna perna*, with mussels in their first, second and third years of growth. Research in Natal has shown that an average length of 6 to 6,5 cm is attained in one year (Berry, 1978). The population at site 3 is dominated by mussels in their first year of growth. This finding supports the findings of previous researchers, who have reported the bulk of the mussels sampled to be in their first year of growth (Anon., 1977a, and Siegfried (ed.), 1977).

It is interesting to compare the size frequency distribution constructed by Siegfried (ed.), (1977), from samples taken at their exploited site at Dwesa with the size frequency distribution from this study at site 2. The transect along which Siegfried worked is located within a kilometre of the transect surveyed at site 2 (as evidenced by the location of the pegs used by the previous researchers).

Figure 39 reflects the size structure typical of an exploited site, with the majority of the population with a shell length under 4 cm. Figure 37, on the other hand, shows how this size structure has changed since exploitation was limited at this site. (For the past three years at least, only visitors to the nature reserve have collected, with only occasional tribeswomen collecting.) The distribution has become bi-modal with a well established community of mussels in their

SIZE FREQUENCY DISTRIBUTIONS OF *Perna perna* AT SITE 2

FIG 39

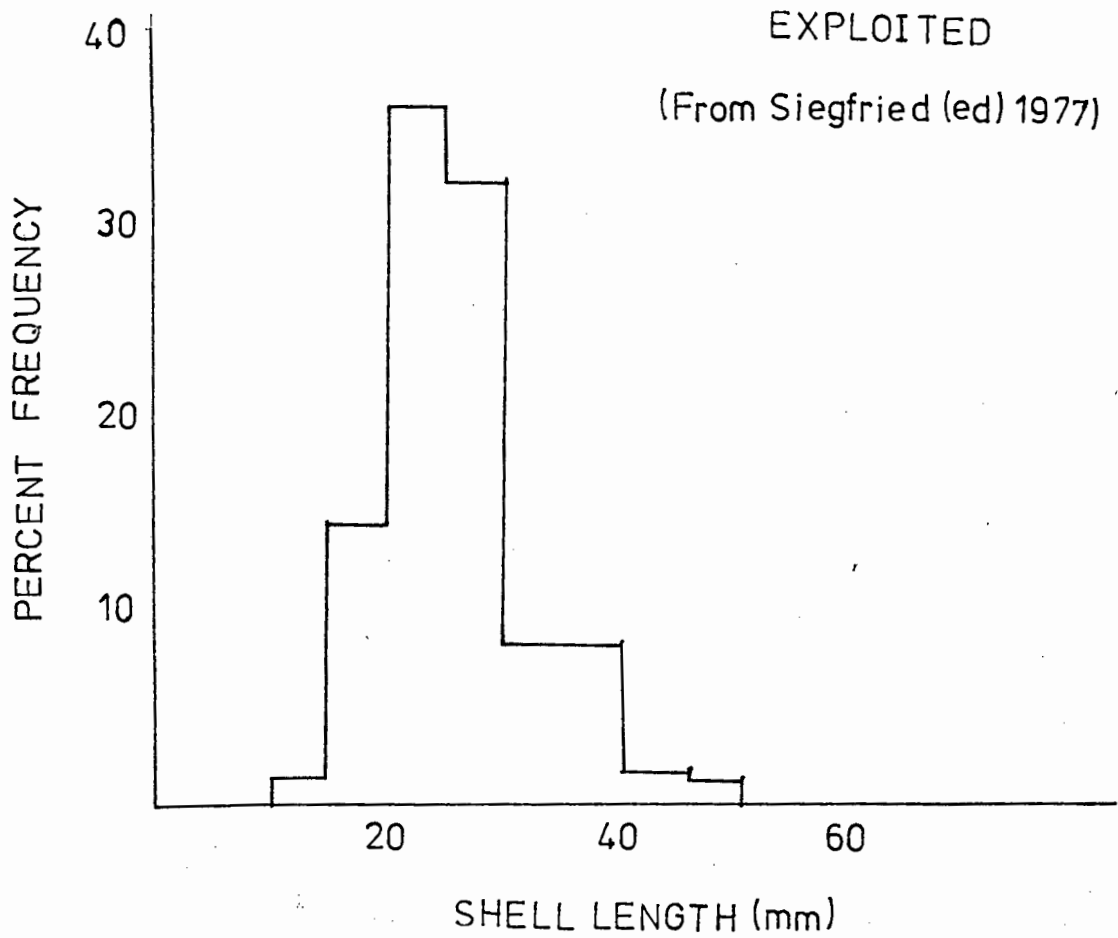
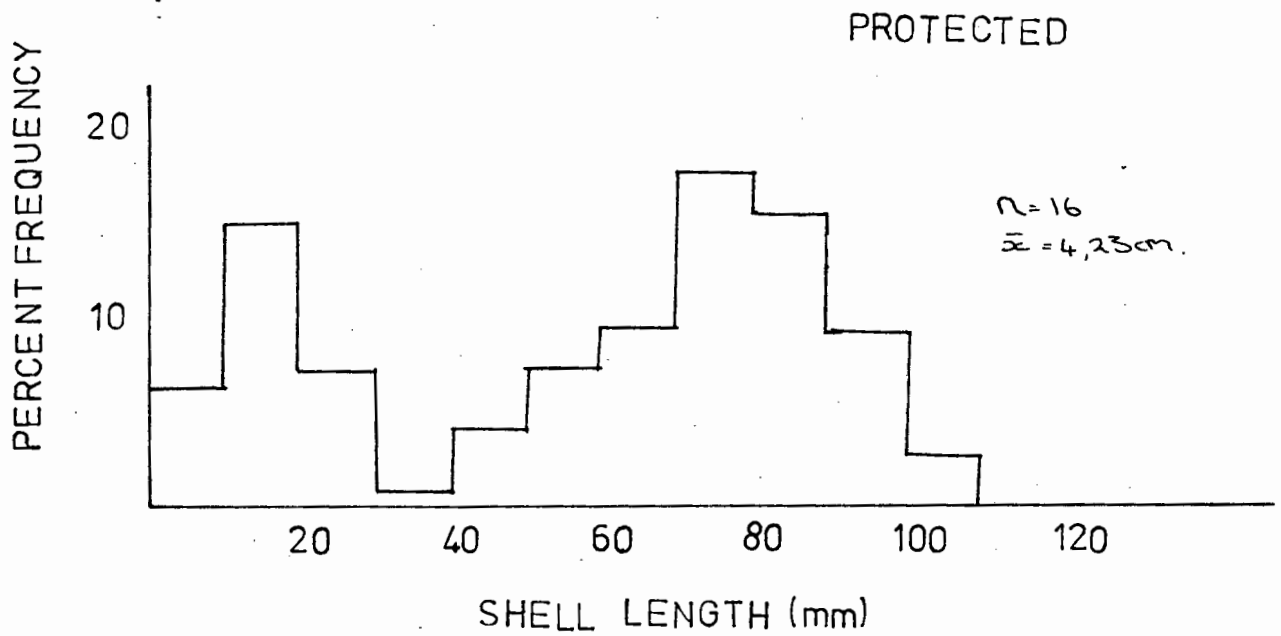


FIG 37



second or subsequent year of growth, as well as a good larval recruitment indicated by the percentage of mussels of shell length 1 to 2 cm.

A decrease in average size results in a decrease in flesh weight (see Figure 8, Chapter 3). This resultant decrease in flesh weight available implies that, more mussels will have to be harvested to obtain equivalent flesh weights.

It would be important, therefore, to ascertain whether:

- (i) the average size of mussels at exploited sites continues to decrease;
- (ii) the local tribeswomen are collecting greater numbers of mussels now than in previous years.

The evidence available suggests that the average size of mussels in exploited areas has not decreased over the past six years, with the populations consisting predominantly of mussels of shell length 2 to 4 cm.

The hypothesis that in many exploited regions the mussel populations are maintaining some sort of equilibrium is supported by the following:

- (i) the size frequency distributions of *Perna perna* at exploited sites have not altered much over the past six years (see Figures 35, 38 and
- (ii) the density/m² of *Perna perna* at site 2 and

site 3 are not dramatically different (see Table 19); and

- (iii) the majority of local tribeswomen reported no change in the availability of shellfish over the years which they had collected. Only 9% of the respondents to the food utilization questionnaire reported a decrease in available shellfish.

The balance is, however, very delicate and where exploitation has been excessive, such as on rocky shores close to holiday resorts, e.g. Coffee Bay (Coffee Bay has two hotels which offer two "seafood evenings" a week, as well as nightly oyster and mussel snacks in the bar), where the commercial market demands all the larger mussels (5 cm+), leaving only the small mussels for food. The system is unable to maintain itself, and the mussel bed in the intertidal zone disappears completely. It has been observed that the degradation of shorelife increases with increasing proximity to the new Wild Coast Holiday Inn and Casino (P. Dutton, pers. comm.).

This situation may also arise during periods of severe food shortage, when the indigenous people are forced to harvest even clumps of tiny mussels.

The available evidence suggests that the number of mussels being harvested by individual women today are not dissimilar to the numbers collected in the past (see Table 20). The numbers recorded by Bigalke (1973)

include figures such as 4, 185, 109, 772 and 1 846. Figures recorded by Siegfried (ed.), (1977) include 152, 107 and 360. These are not different in pattern from the figures recorded in the present study, i.e. similar variability is evident.

TABLE 20 : A COMPARISON OF THE NUMBER OF PERNA PERNA HARVESTED IN PREVIOUS YEARS WITH THE NUMBERS RECORDED IN THE PRESENT STUDY

Site	Shixini	Mbotyi	Dwesa	Hole in The Wall
Researcher	Bigalke (1973)	Bigalke (1973)	Siegfried (1977)	Present Study
Number of <i>Perna perna</i> recorded in meal remains collected by individual harvesters.	17	109	41	617
	185	4	360	1 578
	347	315	152	102
	280	782	107	158
	27	1 846		
	772	3		

The number of mussels that are collected by any particular tribeswomen is influenced by a number of factors:

- (i) The time available to collect. Because the mussel beds are only really accessible during spring low tide periods, the time available for harvesting is controlled by the outgoing and incoming tides. The average time the tribeswomen spend on the rocks is approximately two hours.

- (ii) The availability of mussels. Bigalke's (1973) findings at Ntlonyana indicate very low numbers of mussels collected. The low number of mussels collected was, however, compensated by high numbers of limpets, particularly *Cellana capensis*.
- (iii) The number of people that have to be fed from the collection. Table 3, Chapter 2, shows that a greater number of mussels are collected when more people had to be fed. This hypothesis, however, is based on a very small sample size and, unfortunately, no other research data is available which yields numbers collected in relation to numbers that have to be fed.
- (iv) Personal individual preference. This too is just a theory at this stage, but it appears from the results that when less mussels are collected more limpets are harvested and vice versa (see Table 3, Chapter 2)

However, although the numbers of mussels collected by individual tribeswomen does not appear to have changed much over the years, it is generally accepted that the number of women collecting has increased. If this is true, and if drought conditions prevail on the coast, it could result in the destruction of the existing mussel beds. These would then take a long time to recover on the basis of the research data available on recolonization.

That the existing mussel beds have survived can be partly attributed to the fact that these mussel communities are not dependent entirely on their own reproduction for replenishment of stocks. Fortunately, on the Transkei coast there are areas inaccessible to exploitation and there are good sub-tidal stocks which provide the larvae to replenish the exploited stocks.

An indirect effect of mussel exploitation is the corresponding impact on the species that survive amongst the byssal threads in a large, well established mussel community. At site 1 and site 2, vast numbers of *Holothuria* and *Actinaria* were found amongst the byssal threads. The destruction of the mussel beds, therefore, has an effect on the number of these species which also live on the shore (see Table 21).

TABLE 21 : A COMPARISON OF THE DRY ORGANIC BIOMASS (g/m²) OF HOLOTHURIA AND ACTINARIA BETWEEN PROTECTED AND EXPLOITED ROCKY SHORE SITES

SAMPLE		AUTUMN				WINTER			
Species \ Site		1	2	3	4	1	2	3	4
<i>Holothuria</i> sp.		47,77	25,71	-	4,0	131,46	7,58	-	4,9
<i>Actinaria</i>		2,26	2,50	-	-	5,72	1,31	-	0,03

The discussion to this point has concentrated on the effect of exploitation on the mussel community, as *Perna*

perna is the most heavily exploited species and the effects of this exploitation on the mussel communities is most evident. The effect of the exploitation on limpet populations in this zone is not as obvious as that on *Perna perna*.

The local tribespeople are the only significant harvesters of limpets on the shore, although some fishermen do occasionally use them as bait. The tribeswomen concentrate their efforts at gathering the larger *Patella* species found in this zone, viz. *Patella miniata*, *P. oculus*, *P. longicosta*, *P. tabularis* and *P. barbara*. Bigalke (1973) recorded exceptionally high numbers of *Cellana capensis* in meal remains from Ntlonyana. This is, however, most unusual and is not supported by archaeological evidence (Derricourt, 1977) or subsequent research (Anon., 1977a, and Siegfried (ed.), 1977).

Limpets are grazers, feeding primarily by scraping diatom and algal spores from the rocks. Experiments have shown that the removal of limpets results in increased algal growth (Hawkins, 1981; *Branch, 1981). Limpets are unable to utilize large seaweeds and algal mats on the lower shore, as evidenced by the fact that experimental transplantation of limpets from the upper shore to the lower shore, where they were physically kept, resulted in some actually dying of starvation (*Branch, 1981, p.37). Although the control of algal growth by limpets is most obvious in the middle and

upper regions of the shore, some limpets such as *Patella cochlear* can, however, affect the algal growth on the lower shore * (Branch, 1981, p.37).

The removal of limpets from the *Perna*-coralline algal turf zone would, therefore, compound the effect of mussel removal in that both would promote the growth and spread of algal turf.

The co-existence of limpets in this zone where space and food is a severe limiting factor is dependent on the relationships that exist between the different limpet species and between limpets and other organisms (Branch, 1975b and 1976).

Patella oculus and *Patella longicosta* are both heavily exploited species (see Table 19). Branch (1976) describes the competition between these two species and concludes:

"The continued co-existence of *P. longicosta* and *P. oculus* is dependant on the competitive superiority of the former, allowing it to dominate its narrow niche, and the generalised behaviour of *P. oculus* allowing wider use of resources."

(Branch, 1976, p.521)

Table 19, Chapter Three, shows a high density of *P. longicosta* at site 1 which precludes a high density of *P. oculus* and, therefore, the low density of *P. oculus* in relation to site 2 can be explained in terms of competition. At site 2, where some casual exploitation

*

(Branch G.M & Branch N, 1981, p.37)

does occur, the number of *P. oculus* and *P. longicosta* are more balanced, with *P. longicosta* still the dominant species. At site 3, one would expect, in the absence of competition from *P. oculus*, high densities of *P. longicosta*. However, the exploitation of *P. longicosta* appears to have resulted in maintaining fairly low densities of *P. longicosta* when compared with site 1.

At site 4, intense exploitation may be the cause of the apparent lack of limpets in this zone.

It is important to consider the amount of space available for limpets at each site, as reflected by the percentage area of bare rock, or rock covered with encrusting algae (Table 22).

TABLE 22 : THE PERCENTAGE AREA OF BARE ROCK OR ROCK COVERED WITH ENCRUSTING ALGAE AT EACH SITE

SITE	AUTUMN	WINTER
1	45	41,5
2	43,5	50,0
3	35	23,0
4	15	0,5

It is evident from this table that the percentage of available space decreases with increasing exploitation

One would expect, therefore, that either the number of limpets at each site or the average size of limpets would decrease with increasing exploitation, ~~because of a decreased~~ feeding area.

The results of this survey do not clearly indicate that exploitation has resulted in a decrease in average size of *Patella longicosta* (see Table 19, Chapter 3), however, they do tentatively indicate an effect on numbers.

The results obtained for *Patella barbara* are most surprising as they indicate an increase in number per square metre with increasing exploitation. This result is peculiar and further investigations are required before any conclusions can be drawn.

The data available for *Patella miniata* is such that no conclusions as to the effects of exploitation on this species can be made. It is suggested that further research is needed, in which a larger basic sampling unit is used, to more accurately assess the current state of this species.

A comparison of the mean total length of limpets harvested by the local tribeswomen at site 3, with the mean total length of specimens collected from the same shore through random sampling, yields interesting data.

The mean total length of harvested specimens is on average 2,24 cm larger than those from the random sample (see Table 23).

TABLE 23 : THE MEAN TOTAL LENGTH OF HARVESTED LIMPETS
AND RANDOMLY COLLECTED LIMPETS

Species	Mean Total Length (cm) Random Sample	Mean Total Length (cm) Harvested Specimens
<i>Patella longicosta</i>	2,94	4,46
<i>Patella barbara</i>	2,33	5,37
<i>Patella miniata</i>	3,55	5,71

This information supports that which was found with the harvesting of *Perna perna*, that the local tribeswomen are harvesting selectively, and that there is still recruitment of juveniles, as evidenced by the mean size of individuals in the random sample.

These provisional results highlight the need for more widespread data on the numbers and average sizes of specimens being harvested by the local tribespeople.

Haliotis spadicea is a popular food item, and the effects of exploitation are apparent from the biological survey. The absence of *Haliotis spadicea* from the samples taken at site 3 and 4 indicate that it is rare at these sites and that exploitation appears to have affected the numbers present at these sites (see Table 19, Chapter 3). In the absence of information regarding the original condition of this community no conclusion can be made as to the severity of this apparent decrease in number. From the collections of women at site 3, it is known that this species does

occur on this transect but is rare.

The results of this biological survey do not support the finding of Siegfried (ed.) (1977) that, the number of species is greater at exploited sites than protected sites. In contrast, the number of species at the protected sites was found to be greater than at the exploited sites (see Table 18).

This result suggests that exploitation limits the species composition in this zone. However, further research would be necessary before any definite conclusions can be drawn.

CHAPTER FIVE - THE CONTROL OF THE EXPLOITATION
OF ROCKY SHORE BIOTA

5.1 Existing Legislation and Regulations

At independence in 1976 the Republic of Transkei adopted all the legislation in force in the Republic of South Africa at the time, with the exception of certain Acts which were specifically repealed. There were two Acts pertaining to the use of the intertidal zone in force, viz. the Sea Shore Act, 21 of 1935, and the Sea Fisheries Act, 58 of 1973 (see Appendix 3).

The Sea Shore Act, 21 of 1935, has since been repealed in the Republic of Transkei and replaced by the Sea Shore Act, 17 of 1979 (see Appendix 3). The Long Title of this Act is as follows:

"Act to declare the State to be the owner of the sea-shore and the sea within the territorial waters of the Republic of Transkei; and to provide for the grant of rights in respect of the sea-shore and the sea and for matters incidental thereto."

(Sea Shore Act, 17 of 1979).

The sea is defined as "the water and the bed of the sea below the low water mark (the lowest line to which the water recedes during periods of ordinary spring tides) and within the territorial waters of the Republic, including the bed of any tidal river and of any tidal lagoon".

The sea-shore is defined as "the water and the land between the low water mark and the high water mark". This definition includes the intertidal rocky shore as being part of the sea-shore.

The importance and relevance of this Act to the exploitation of the rocky shore biota lies mainly in Section 10 of the Act.

Under Section 10, the Minister, who for the purposes of this Act is the Minister of Local Government and Land Tenure, may make regulations concerning, among other things:

- (i) The use of the sea-shore (10.1a).
- (ii) The removal of any material from the sea-shore and the sea (10.1c).
- (iii) The control, generally, of the sea-shore and sea (10.1e).

Moreover, subsection 7 of Section 10 states:

"Any regulation made under subsection 1 or subsection 6, may differentiate between different classes or kinds of users of the sea-shore or the sea, may prescribe different fees or conditions in respect of different classes or kinds of the said users and may prescribe that any local authority responsible for the administration of any such regulation, may grant any consent under such regulation on such terms or conditions as it may deem fit."

(The Sea Shore Act, 17 of 1979)

When the Sea Shore Act, 21 of 1935, was repealed, the

regulations made under Section 10 of this Act were not repealed with the Act but became the regulations applicable under Section 10 of the new Act.

At present there are no regulations made under this Act which control the activities of the various shellfish harvesters. At present the regulations seem concerned with matters such as buildings and animals (e.g. horses and dogs) on the beach.

From the definitions given in the Act it would appear, however, that the scope of the Act could be broader and regulations pertaining to the activity of shellfish harvesting could be made under the Act. The Act also makes provision for considering different users of the sea-shore, an important consideration in view of the fact that there are three different categories of shellfish exploitations, viz. indigenous people collecting for food, tourist-based exploitation and commercial exploitation.

The Sea Fisheries Act, 58 of 1973, has as its Long Title:

"Act to provide for the control of sea fisheries and for matters connected therewith."

(Sea Fisheries Act, 58 of 1973)

The definitions of sea, sea-shore, low water and high water are the same as those given in the Sea Shore Act, 17 of 1979.

The Sea Fisheries Act is, at present, the most important and relevant Act pertaining to the exploitation of the intertidal rocky shore and, therefore, demands careful consideration.

The Act is under the control and jurisdiction of the Transkei Department of Commerce, Industry and Tourism, and has not been amended other than by the General Laws Amendment Act since independence in 1976. The sections of importance for the control of the exploitation of rocky shore biota are: sections 2, 5, 6, 12 and 13.

Section 2 makes provision for the Minister to appoint fisheries advisory councils. This is an important provision and one that is vitally necessary in the case of the rocky shore biota, where ignorance of the nature, functioning and importance of the ecosystem, has been admitted by the department concerned. However, no such council has yet been established in the Transkei.

Sections 5 and 6 deal with the appointment and powers of honorary fisheries officers and fisheries inspectors. In the Transkei the function of the enforcement of regulations made under the Act has been delegated to the Department of Agriculture and Forestry, Nature Conservation Division.

The nature of the coastline and the existing infrastructure make it difficult, if not impossible, for a small, understaffed division to render adequate control.

The appointment of properly trained, honorary fisheries officers would alleviate this problem to some extent, especially if use were made of camp owners who visit the coast frequently and have a keen interest in the coast and its conservation. Honorary fisheries officers have been appointed in Transkei but not without certain problems which will be discussed in greater detail in Chapter Six.

Sections 12 and 13 deal with the issue of permits for commercial exploitation, regulations as to the size and number of each species a person is permitted to collect, and control measures for the removal of rocky shore biota.

The regulations made under Section 13 of the Act were published in the Government Gazette on 12 October 1973. The regulations (see Appendix 3) were adopted by the Transkeian government with the Act at independence and are the regulations currently applicable to the Transkei coast.

A major shortcoming with these regulations is that no provision has been made to consider different classes of users of the rocky shore biota. This has led to confusion among visitors to the coast, who observe the indigenous people harvesting freely, while being perhaps unaware of the existence of regulations.

Analysis of the coastal usage survey revealed that the

majority of people visiting the Transkei coast were basically unaware of the regulations pertaining to the removal of certain species from the rocky shore inter-tidal zone (see Table 24).

TABLE 24 : THE PROPORTION OF INDIVIDUALS WITH THE CORRECT KNOWLEDGE OF THE REGULATIONS

Regulation pertaining to:	The number of mussels allowed per person per day	The number of oysters allowed per person per day	The number of crayfish allowed per person per day	The number of octopi allowed per person per day	The closed season of crayfish	The closed season of oysters
The proportion of visitors to Transkei aware of the regulation (%) N = 150	16	13	27	10	26	6
The proportion of residents of Transkei aware of the regulation (%) N = 62	32	18	56	7	48	15

The residents of Transkei are generally more aware of the regulations than the visitors to Transkei, however, the proportion aware is still low. The regulations pertaining to crayfish are most well known.

To date there is no recorded case of a person or persons being brought to trial under the Sea Fisheries Act.

There have, however, been an increasing number of spot fines given to people transgressing the provisions of the regulations. The maximum fine for contravening the regulations made under Section 13 of the Act is R1 000 or a period of imprisonment not exceeding one year.

5.2 Departmental Structure and Available Manpower

The policing and practical control of the exploitation of the rocky shore biota falls under the Division of Nature Conservation. It is important to have an understanding of the structure of the department and the problems it faces in terms of this control if one is to make recommendations that would be feasible and practically possible.

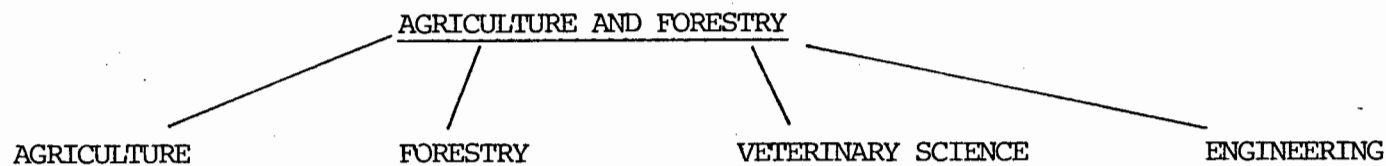
Nature conservation is one of the two divisions of the Directorate of Forestry (see Figure 40). Nature conservation in turn has two major divisions, viz. management and research. The control of the coastal exploitation falls under the management section which is responsible, in addition, for the planning, maintenance and running of the nature reserves, predator

FIGURE 40 : DIAGRAM TO SHOW THE RELATIVE POSITION, STRUCTURE AND MANPOWER STATUS
OF THE DIVISION OF NATURE CONSERVATION

DEPARTMENT

Minister : Mr Boo
Secretary: Mr Mbokodi

DIRECTORATES



DIVISIONS

SECTIONS

- | | |
|--|--|
| <p><u>FORESTRY</u></p> <ul style="list-style-type: none"> - <u>Management</u> (1 Senior Prof. Officer) - <u>Nature Reserves</u> - <u>Predator Control</u> (3 Huntsmen) - <u>Camping and Hiking</u> - <u>Posts:</u> <ul style="list-style-type: none"> 1 Chief Nature Conservation Officer (vacant) 2 Senior Nature Conservation Officers (1 vacant) 4 Grade One* Nature Conservation Officers (4 vacant) 8 Grade Two* Nature Conservation Officers 2 Trainee Nature Conservation Officers | <p><u>NATURE CONSERVATION</u></p> <ul style="list-style-type: none"> - <u>Research</u> (1 Senior Prof. Officer) - <u>Flora</u> (1 Prof. Officer) - <u>Fauna</u> (1 Prof. Officer) (vacant) - <u>Fisheries</u> (1 Prof. Officer) (vacant) - <u>Extension</u> (3 Prof. Officers) (2 vacant) |
|--|--|

* A Grade One Nature Conservation Officer (N.C.O.) has matric, a diploma in nature conservation and experience.
A Grade Two N.C.O. has matric and a diploma.

++ Information supplied by Mr W. Qaba, Head of The Nature Conservation Section

control and the control of camping and hiking on the coast. The research section has four portfolios: flora, fauna, fisheries and extension.

There are 26 official posts available in the division and of these approximately 12 are vacant (see Figure 40). Thus, it is evident that the division faces a chronic manpower shortage which is a severe limiting factor to the efficiency of the division. The reasons given for the current manpower shortage are as follows:

(i) Salaries

At least sixty percent of the qualified nature conservation officers have been lost as a direct result of poor salaries.

(ii) Limited incoming qualified manpower

Only two students per year from the Transkei can attend Kwaga College (where they receive their training in nature conservation).

(iii) Housing shortages

It is extremely difficult to obtain housing for senior staff in Umtata.

At present there are a total of five nature conservation officers responsible for patrolling the entire coastline, a distance of approximately 270 km. The patrols are done on foot or by vehicle. Both are time consuming methods. There are plans, however, to use horses for patrol work. This would increase the distance that could be patrolled

in a day and thus the efficiency of this operation.

In addition to the basic manpower problems of the division, conservation as such enjoys a low status in the government hierarchy and thus has a very limited budget. These two factors combined make it extremely difficult for the division to achieve its objectives in coastal conservation and should be taken into careful consideration in the proposal of control measures in the exploitation of rocky shore biota.

5.3 Control Measures Existing and Planned

The direction of control measures aimed at the exploitation of rocky shore biota differs according to the class of user.

The control of the exploitation by indigenous Transkeians is aimed at the education of the people toward the concept of sustained yield. No attempt is made to fine or prosecute, despite the fact that legally the same regulations apply to these people. This method appears to be having some success as evidenced by the responses of some indigenous women to the food utilization questionnaire. Women from the Kei-Qolora district responded that they used to collect as much shellfood as they could at one time but now they only collect enough for their families, as they have been told to do this. They also reported no longer selling their shellfish, as they had been instructed by the Forestry Officers not to do

so. They must report to the forestry N.C.O. each time they want to collect. From the nature of the responses it appears that the women have accepted this form of control without anger or suspicion.

The control of the tourist exploitation is done primarily through the medium of law enforcement. Periodic spot checks are made at points along the coast during spring tide periods. Any person who is found to have contravened the regulations in any way is fined. Spot fines to the amount of R200 can be given. Road blocks are set up along the roads to resorts at peak holiday season and cars are checked for certain plant species as well as crayfish, etc.

The division has plans for tighter control of camping and hiking along the coast. At present camping in magisterial areas falls under the Forest Act of 1974. Plans exist to repeal the above-mentioned Act and have the control of camping entirely under the division of Nature Conservation. The tighter camping regulations will, it is hoped, facilitate easier control of pollution, degradation of vegetation, and the sale/purchase of shellfood.

Within the nature reserves, the indigenous peoples are still "theoretically" allowed to collect shellfish. The shellfish is harvested under the supervision of a nature conservation officer, whose duty it is to educate the people as to the number, sizes and condition of the

various species that they are allowed to exploit.

This exploitation within the reserves functions on a rotation basis. Dwesa, for example, has been divided into four zones, each zone is exploited over a period of one year and then left for a period of three years to recover. At Cwebe this system is not yet in operation, but the reserve has been divided into proposed zones.

The tourists in the reserve are also able to exploit the intertidal rocky shore. A recent development in the control of this exploitation is that visitors are now shown a copy of the Sea Fisheries regulations, which they are expected to read. Prior to this, many people visiting even the nature reserves were not aware that there were regulations of this nature pertaining to the Transkei coast. This aspect will be discussed in greater detail in Chapter Six.

CHAPTER SIX - RECOMMENDATIONS
AND CONCLUSIONS

6.1 Introduction

In the planning and proposal of practical measures to aid in the conservation of the rocky intertidal zone, there are certain basic considerations which must be taken into account, such as:

- (i) The rural Transkei peasants of the coastal region have subsisted partially on food taken from the intertidal zone since the seventh century A.D. (Cronin, 1982) and are still heavily dependant on this food source.
- (ii) Transkei is a developing third world country in which, as might be expected, conservation enjoys a very low status in the government hierarchy and consequently a low budget.
- (iii) The control of legislation regarding the exploitation of the intertidal zone is divided between various government departments, between which there is little communication at present.
- (iv) The existing infrastructure of roads to coastal areas makes policing, control and management of regions outside nature reserves difficult and expensive.

Previous surveys by The Wildlife Society of South Africa (Anon., 1977b) and The Oceanographic Research Institute (Anon., 1977a) have recommended that the harvesting of marine resources within conservation areas be prohibited. This attitude is, however, impractical and undesirable if conservation is to succeed on the Transkei coast.

It is becoming increasingly recognised throughout Africa that the western preservationist concept of conservation is not acceptable in Africa. Dr I. S. Parker, a conservationist in Africa, feels strongly in this regard and has the following to say:

"History is replete with examples of strong social tensions arising from endeavours to preserve wildlife. There have been many recent instances of this in Africa in recent times. These have arisen from the western ethos of preservation being forced upon Africa during the colonial era and continued under the independent governments which succeeded it. Hence, in Africa it is necessary to enforce conservation with armed paramilitary scouts or guards, whereas in Europe it succeeds with unarmed staffs. Imposition will continue to be necessary for as long as the populace at large is not in sympathy with the general objective."

(Unpublished paper, 1982, p.12)

And in the words of Dr K. L. Tinley:

"The present and future survival of wildlife and natural areas in Africa depends almost exclusively on the favour of the rural human populations in contact with them. All conservation measures will be fruitless until these populations are made to realise the value of these areas by obtaining immediate tangible benefits from them and until they are involved in their protection and use as

part of the regional economy in the widest sense."

(K. L. Tinley, 1979, p.29)

This new philosophy of nature conservation is clearly reflected in the IUCN world conservation strategy definition of conservation as "the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations".

The purpose of this discussion is perhaps threefold. Firstly, to recommend that the Transkei Department of Nature Conservation formulate an unambiguous policy statement, stating clearly the goals and objectives of conservation in Transkei and formulating a clear definition of conservation. The importance of such a statement would be to clarify any misconceptions that may have arisen in the minds of the politicians and others concerning the purpose of conservation that may have stemmed from 'earlier' preservationist attitudes to conservation.

This would serve to direct research toward conservation recommendations fitting the overall policy, aims and objectives of conservation in the country.

This would caution against the imposition of "western" preservationist measures on the rural peoples dependent on the intertidal zone as a food source, no matter how

rational they may seem. It would be preferable to recommend a more gradual overall conservation programme involving the peoples of this area.

In this sense it is recommended that the primary objective for conserving coastal areas be to benefit the people of that area in a tangible and real way, by having them functioning as resource pools carefully managed on a sustained yield basis.

6.2 Recommendations Concerning The Exploitation By The Indigenous Tribespeople

The Transkei Nature Conservation Division has accepted in principal the multiple use concept for nature areas and has implemented this concept to some extent in the Dwesa Nature Reserve. The rural people living on the outskirts of the reserve are able to cut thatching grass and are able to purchase the meat of game culled in the park at nominal cost when it is available (A. Bayleveldt, pers. comm.). The planned rotation scheme for the harvesting of intertidal fauna is an important aspect of the multiple use nature of the reserves. A comment from a man living on the outskirts of the reserve that, now he "understood the purpose of this "government farm" and thought it good" (A. Bayleveldt, pers. comm.), reflects the success of working and managing a reserve for the benefit of the people.

Great care must, however, be taken in these situations

that the people become educated regarding the basic principals of conservation at the same time as receiving tangible benefits from the conservation areas.

At present there is a scheme operating whereby chiefs from different regions are taken into a conservation area, such as the Dwesa Nature Reserve where the concept and importance of conservation is explained to them in a practical way. This has had the effect that some chiefs are now requesting their own conservation areas (A. Bayleveldt, pers. comm.). This programme should be intensified and broadened to include ongoing discussions to co-ordinate and manage the areas that are to be set aside. Where a basic understanding, an acceptance of, and a desire for a conservation area has been accomplished, the people themselves should be educated and encouraged to manage, to a limited extent, such areas on their own, if "official" manpower and finance does not permit the formation of a "declared reserve".

The government policy at present of education rather than law enforcement for the local population is good and it appears to have been well received in the southern region of Transkei, as evidenced by the comments on the food utilization questionnaire.

Such programmes are necessary but they are long term projects and do not provide an answer for immediate control measures. It may, however, be argued that no

successful immediate measures could be instituted for people who have utilized this resource for many hundreds of years. To have a chance of success it would be necessary to have such measures heavily policed and enforced and Dr Parker (1982) has suggested that such efforts only lead to negative attitudes and antagonism from the people who must live with the consequences.

However, certain key areas could be identified and given concentrated attention rather than focussing on the entire coast.

More detailed research is needed regarding the basic psychological understanding the people presently have regarding this resource. Baseline data on the number and sizes of species harvested is urgently needed to aid scientists to plan how species could be exploited on a sustained yield basis.

6.3 Recommendations Regarding Tourist Usage

The system of law enforcement currently being used by the Division of Nature Conservation, together with a programme to increase the "regulation awareness" of coastal visitors is probably the most effective way of controlling tourist usage of the coast and the exploitation of rocky shore biota by coastal visitors.

Because of the inherent difficulties involved in policing the coast, including the time taken to travel from one

site to another, it is desirable that certain control measures regarding tourist usage of the coast be introduced.

For years visitors to the Wild Coast have felt free to camp anywhere along the coast but there has been much basic disregard for the environment, such as trees being broken for firewood and litter left strewn around campsites. In one instance, a strelitzia forest was stripped to provide soft beds for campers (A. Bayleveledt, pers. comm.). Such activities have necessitated that both camping and hiking be strictly controlled.

The Division has plans to develop specific camping areas along the Wild Coast, providing basic ablution and waste disposal facilities. Camping would then become restricted to these campsites. These campsites should be developed in such a way as not to detract from the major attraction of the coast, viz. its unspoilt beauty.

Most respondents to the coastal usage survey indicated that, although they enjoyed the freedom of the Wild Coast stricter control measures were necessary. Thus, it is unlikely that such campsites would reduce the tourist potential of the coast. In contrast, it would enhance it, provided that the campsites were developed with sensitivity.

The stricter control of camping would facilitate easier control of the exploitation of the intertidal zone by

tourists. The camp guard could be given the status of an honorary nature conservation officer and should receive basic training regarding regulations pertaining to coastal usage as well as the exploitation of shellfish. *Camp Guards would be employed by the division of nature conservation, and trained by them.*

Greater use could be made of cottage owners who are willing to serve as honorary conservation or fisheries officers. This could help to alleviate the manpower problems faced by the Division of Nature Conservation.

Honorary fisheries officers would have the responsibility of checking that the regulations regarding the exploitation of the rocky shore were not contravened. They could also serve an interpretive function by educating coastal visitors, including cottage owners with regard to the regulations pertaining to the removal of rocky shore biota.

Honorary fisheries officers are appointed in terms of Section 5 of The Sea Fisheries Act, 58 of 1973, by the Transkeian Minister of Commerce, Industry and Tourism. It is, however, the responsibility of the Division of Nature Conservation to ensure the regulations made under this same Act are enforced. Therefore, it is suggested that this power of appointment be delegated to the Division of Nature Conservation.

The honorary fisheries officers, together with the honorary nature conservation officers (appointed in

terms of the Nature Conservation Act of 1971) could receive the necessary training and directives from the Division of Nature Conservation. This would enable greater co-ordination of the law enforcement effort.

The sale or purchase of most species of shellfish without a permit to do so is prohibited in terms of the regulations made under Section 13 of the Sea Fisheries Act, 58 of 1973 (regulation 57(3)).

The purchase of shellfish by tourists from the local tribespeople is, however, despite its illegal nature, part of life on the Wild Coast, with both the visitors and the local tribespeople benefitting from the activity.

The Division of Nature Conservation has, to date, made no effort to stop or control this activity by enforcing the regulation mentioned above. Although it would be undesirable in terms of tourist enjoyment of the coast and the local economy of the tribespeople that this regulation be strictly enforced, it is equally undesirable that such activity continue uncontrolled.

Since the regulations make provision for the issue of permits, it is suggested that this be the form of control used.

Persons wishing to obtain shellfish from the shore could apply for a permit to do so, whether the shellfish is to be collected personally or bought from the local tribespeople. A permit, such as that outlined

in Schedule 3 of the regulations, could then be issued at a certain fee. A scientific advisory council should decide annually the number of permits to be issued. It is recommended that all cottage owners be given the option to purchase a permit, with a set number remaining for campers, hikers and other visitors to the coast.

A scientific advisory council should also decide on the numbers of each species to be allowed on a permit. The permit system allows flexibility in this regard, in that the numbers of a species allowed on a permit could be varied according to the area applied for in the permit.

The closed seasons for crayfish and oysters should still apply and no permit would be valid for these species during the closed season.

It is strongly suggested that the Division of Nature Conservation motivate that the right to issue such permits be delegated to the Division, rather than remain with the Department of Commerce, Industry and Tourism, as this would facilitate control over the permit system.

As was mentioned in Chapter Two, data on the purchase of shellfish is difficult to obtain, a reason being that it is known that this activity is illegal^{*}. A permit system would allow a greater control over the sale and purchase of shellfish and direct tourist harvesting, and it would facilitate the monitoring of such activities for future planning. The revenue obtained from the issue

The activity is illegal because the provision of permits in the regulations is not been utilized currently in Transkei.

of permits should be used to further the goals of conservation in Transkei.

6.4 Recommendations Concerning Commercial Exploitation

It is evident from discussion* that most commercial operations on the coast have failed for various reasons. These include inadequate initial capital to provide the necessary equipment such as adequate storage and transport facilities, the unpredictability of the resource base to ensure a steady income. Most companies can only really harvest for eight to ten days a month over a spring tide cycle and if weather conditions are unfavourable during this period, they are prevented from obtaining a good harvest.

It is suggested that an economic feasibility study be undertaken to determine the long term viability of this type of exploitation. It will be necessary to assess its benefit to the Transkei economy as a whole. Should such a study indicate that in the long term this activity would not be viable or beneficial to the Transkeian economy, such activity should be terminated.

The feasibility of the mariculture of certain species on the coast for commercial purposes, should be investigated as an alternative to current commercial exploitation.

If the current commercial exploitation of the intertidal

* Discussions were held with officials of the dept of Commerce, Industry & Tourism, Cottage owners & the manager of Sea Harvest Transkei

zone is to continue the following recommendations are made:

- (i) that a scientific advisory council, as described by Section 2 of the Sea Fisheries Act 58 of 1973, be formed by the Minister of Commerce, Industry and Tourism;
- (ii) that this council be given the authority to determine which species should be exploited and the quotas to be allowed;
- (iii) that such quotas should be reviewed on an annual basis;
- (iv) that the conditions of licence be reviewed by the council. Such conditions must be strictly adhered to from the outset by companies applying for a commercial licence;
- (v) that correctly completed catch returns be insisted upon from the outset and that these be submitted to the scientific advisory council;
- (vi) that under no circumstances should commercial companies be given a licence to exploit the brown mussel *Perna perna* which is the primary food item from the rocky shore for the indigenous people;
- (vii) that areas of commercial operation should

be restricted and rotated annually on the advice of the scientific advisory council. The issuing of blanket licences for the entire coast makes the control of this activity very difficult.

6.5 Recommendations Concerning The Legislation

A great deal of confusion exists in Transkei concerning what legislation is applicable to the coast and what the specific regulations pertaining to the removal of shellfish from the rocky shore are.

At present, as was outlined in Chapter Five, the South African Sea Fisheries Act 58 of 1973, applies in Transkei. This Act has been revised several times in South Africa since independence in 1976, with the most recent revision being made in 1983. The Sea Fisheries Act 58 of 1973 is, therefore, outdated and its applicability to the Transkei situation today is questionable.

It is rumoured that this Act is to be revised for the Transkei. Every effort should be made to encourage and hasten such a revision for the Transkei coast. It is strongly recommended that provision be made in the Transkei Sea Fisheries Act to allow for different regulations to be applied to the different categories of exploitation, such as subsistence exploitation, tourist exploitation and commercial exploitation.

The regulations promulgated under Section 13 of the Sea Fisheries Act, 58 of 1973, which, therefore, apply to the Transkei, are outdated and are not specific to the Transkei coast. The Transkei falls within the transition zone between East and South Coast species (Stephenson, 1944), so specific regulations appropriate to the area are required. It is suggested that new regulations be drawn up in the light of current scientific information. These regulations should replace the old regulations whether or not the Act is revised.

If the permit system outlined in Section 6.4 is adopted, this system should be incorporated into the new regulation in greater detail.

It is also strongly recommended that the Division of Nature Conservation meet with the Department of Local Government and Land Tenure to discuss the implications of The Sea Shore Act, 17 of 1979, for controlling activities on the shore that hamper the basic conservation goals of the Division.

It is desirable that all visitors to the coast be made aware of conservation regulations. It is suggested:

- (i) That the pertinent regulations be summarised and that a copy of these summarised regulations be attached to each camping permit issued.
- (ii) That a copy of these summarised regulations

be distributed, through the cottage owners association, to all cottage owners and that they be displayed in the cottages for the benefit of guests.

- (iii) That each coastal hotel or holiday resort be required to display the regulations in a prominent position.
- (iv) At the beginning of each holiday season a newspaper article should be written stating the pertinent regulations controlling coastal usage in the broadest sense, i.e. including information on camping areas and hiking trails. This article should then be distributed to newspapers serving all the provinces of the Republic of South Africa and the Republic of Transkei.
- (v) At the start of the closed seasons for crayfish and oysters and at the start of the December holidays, announcements of the closed seasons be made over the radio in all provinces of the Republic of South Africa and the Republic of Transkei.

6.6 General Recommendations

6.6.1 Increasing the Conservation Awareness of Politicians

Communication between interested parties and between the relevant government departments is essential for the success of coastal conservation measures. Poor communication between departments is evident in the Transkei today and every effort should be made to change this situation.

Attempts by the Division of Nature Conservation to facilitate communication with the Department of Commerce, Industry and Tourism have, unfortunately, been unsuccessful thus far.

It is suggested that a conservation awareness programme aimed primarily at the politicians should be devised. The purpose and importance of such a programme will be to upgrade the concept and standing of conservation in Transkei, which in turn may facilitate the granting of a more reasonable budget.

The politicians should be shown in a practical way how conservation activities can benefit and upgrade the quality of life of the people of Transkei. The potential importance to the economy of the country should be stressed.

Such a programme should be ongoing as it will

take time for certain ideas to be accepted.

6.6.2 Research on the Transkei Coast

At present research on the Transkei coast intertidal zone is carried out with little communication between the various research groups.

Researchers from different universities throughout South Africa come into Transkei and conduct investigations which are often in the form of one-off surveys. In some instances the Division of Nature Conservation is not even informed or approached for permission to carry out such work, nor are the relevant departments of the University of Transkei contacted. This has had the effect that research on the coast is unco-ordinated and repetitive, often resulting in a degree of "academic competition".

The University of Transkei has extensive and carefully planned monitoring programmes underway, specifically in regard to the intertidal zone and, therefore, should be consulted regarding where and what research is needed on the Transkei coast.

It is strongly recommended that all research projects, no matter how small, concerning the rocky shore intertidal zone and other ecosystems be screened by a panel consisting of members of

the University of Transkei and the Division of Nature Conservation. This panel could help to guide research priorities for the practical benefit of Transkei.

Because Transkei is a developing nation, desperately needing information for future planning but unable to support extensive research programmes, all projects carried out in Transkei should be presented to the Transkeian government in a practical and useful form.

6.6.3 Improving the Nutrition of the Coastal Inhabitants

The Division of Nature Conservation should liaise with the Department of Health regarding the coastal inhabitants. It is suggested that a greater use of chickens and pigs as a protein source be encouraged and that the tribespeople be encouraged to diversify the crops grown in their gardens, specifically the vegetables.

6.7 Overall Summary and Conclusions

The harvesting practices of the indigenous coastal Transkeians have remained essentially the same over the last few years. The intensity of collecting, however, is thought to have increased due to the greater number of women collecting and the drought conditions of the past few years.

The brown mussel *Perna perna* is the major species collected, however, the larger *Patella* species, and *Pyura stolinifera* are also popular food items. The species harvested have not changed over the years and, therefore, the high correlation between species present in archaeological middens and species currently collected by local tribespeople reported by Derricourt (1977), still exists.

Crayfish exploitation is increasing due to commercial demand and is facilitated by the use of more "sophisticated equipment" such as goggles and gloves.

The sale of shellfish continues to play a fairly important role in the local economy with respondents reporting earnings of R4 to R15 a day for their harvest. During the peak holiday season such as the Easter weekend and the school holidays, shellfish is harvested specifically for sale and species such as *Crassostrea margaritacea* are heavily exploited for financial gain. At other times a general decrease in the shellfish available for purchase was reported by cottage owners.

It was not possible to assess the impact of the tourist industry on the rocky shore biota directly, as quantities removed or purchased were unobtainable. The results from site 4, however, suggest that the purchase of shellfish by the hotels has created an excessive strain on certain rocky shore communities. In particular, the mussel community and the subtidal oyster *Crassostrea margaritacea*. It is difficult to assess the impact on crayfish stocks, but this is an area that requires urgent attention.

The sale and purchase of shellfish is an integral part of life on the Wild Coast and should not be abolished, however, tighter control is urgently needed and recommendations to this effect are made.

There is general confusion surrounding the legislation and the regulations pertaining to the rocky shore and the full potential of the existing legislation is not being realised. For example, the implications of The Sea Shore Act for coastal conservation have not been explored. The Sea Fisheries Act is outdated and should be revised and the regulations made specific to the Transkei coast. A programme to increase the regulation awareness of tourists is needed and is recommended.

The Division of Nature Conservation is severely hampered in achieving its conservation goals by financial and manpower constraints. A programme to increase the status of conservation in the country is recommended.

The conservation programmes recommended in this study would require the appointment of one additional professional officer, whose job it would be to initiate and co-ordinate the various programmes and to act in a public relations capacity. Greater use of trained honorary fisheries and conservation officers would alleviate manpower problems in the control of tourism.

The effect of commercial exploitation on the rocky shore biota could not be assessed as no commercial companies were operating in any of the study areas. However, under the present licencing system and with the prevailing government attitude, severe degradation can be 'legally' allowed. This is an area, therefore, of grave concern and stricter controls are required and are recommended.

The biological surveys indicated that exploitation was having a discernable effect on ^{certain} rocky shore communities particularly in the *Perna*-coralline algal turf zone.

The population structure of the *Perna perna* communities has altered as a result of exploitation. Young relatively unstable communities of *Perna perna* are characteristic of exploited sites and they are dependent on recruitment from inaccessible mussel stocks for their continued survival.

The effects of exploitation on the limpet populations are less obvious and require further research. The

removal of limpets, however, compounds the effect of mussel removal in increasing the percentage cover of coralline algal turf.

The variation in species present or absent in the balanoid and crassostrea zones was found to be due primarily to physical-biological differences between the sites, such as rock surface geology, rock colour, slope, the presence or absence of rock pools, shade and predation and competition, as well as to random sampling variation.

There are indications that exploitation has had an impact on the *Crassostrea cucculata* communities, resulting in a decrease in average size at exploited sites.

There are no indications, from this study, that exploitation is having an effect on the limpet populations of the balanoid and the crassostrea zones.

The local tribeswomen do selectively harvest larger species and it was found that the average size of the mussels in meal remains was 1 to 2 cm larger than the average size from random samples and the average size of limpets in meal remains was 2 to 4 cm larger than the average sizes found in the random samples.

The possibility that certain rocky shore biotic communities were maintaining a delicate balance at exploited sites was suggested, in the light of the fact that the population structure of exploited mussel beds have remained essentially the same for the last six years.

This suggestion raises the question of whether drastic conservation measures are required on the Transkei coast.

It is concluded that a carefully planned conservation programme is required for the Transkei coastal area. This should include immediate control measures aimed primarily at the tourist and the commercial operator, as well as long term conservation measures directed towards and in sympathy with the local people. Drastic conservation measures imposed upon the indigenous people would be counter productive in that they would result in the formulation of antagonistic negative attitudes to conservation as has been evident in rural situations throughout Africa.

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APPENDIX ONE

Instructions for administration of the
"Food Utilization Questionnaire"

Food Utilization Questionnaire

Coastal Usage Survey

Letter and reply sheet sent to selected
cottage owners regarding observed changes
in shellfood collecting.

INSTRUCTIONS FOR ADMINISTRATION OF THE "FOOD UTILIZATION QUESTIONNAIRE".

PLEASE READ CAREFULLY BEFORE ADMINISTERING THE QUESTIONNAIRE.

GENERAL

1. Only women who collect shellfood are to be asked the questions.
2. The women must be of different ages ie not only young mothers.
3. The questions must be asked in such a way to establish what is true generally and not only what the situation is now.
4. The question of distance lived from the coast, should be rephrased, as follows:
"How long does it take you to walk from your home to the rocks".
5. The replies are to be written by the person asking the questions, onto the question paper in English.
6. If there is not enough space provided to write the reply, the left hand-side of the page can be used. In this case, the question number must be clearly marked above the reply.

SPECIFIC DETAILS

SECTION ONE : CROP PRODUCTION

Question One:

- A distinction must be made between what is grown on the lands and what is grown in the gardens.

SECTION THREE : ROCKFOOD|SHELLFOOD UTILIZATION

Question Two:

- Include in this question, questions such as "is the collecting done as a group or individually? and if individually - do the women take it in turns to collect?"

Question Six:

- The Xhosa names are sufficient here.

Questions Eight and Nine:

- As much detail as possible is to be recorded here. For more detail the following questions should be included:
 1. How often do you sell or exchange what you have collected?
 2. Do you decide before you start to collect that you are going to sell?
 3. Do you sell everything you collect? or do you keep some back for the family?
 4. Would you sell everything you had collected if you could? Even if this would mean your family would not eat shellfood.

Question Thirteen:

- This question is aimed at collecting for commercial operators and would not include camp owners or hotels.

An additional Question regarding the financial status of the family is to be asked.

- Does your Husband or Sons work? If so, where:
 1. On the mines
 2. In town, eg Umtata
 3. Locally - for camp or hotel
 4. Other [Please state].
- Do you have a regular job?
- Where else does the family get money from?

FOOD UTILIZATION QUESTIONNAIRE

AREA :

Age of respondent : 10-20 21-30 31-40 41-50 over 50

Approximate distance lived from the coast:-

Less than one km. ☐

6km - 10km ☐

1km - 3km ☐

More than 10km ☐

3km - 6km ☐

Introduction

Some people from the University in Umtata are doing a study on the food needs and uses of the people living in the Transkei. To do this they have made a list of the things that they want to find out and they have asked me to help them by asking you the questions.

It is important for you to understand that no harm can come to you if you answer these questions, because I will not be giving them your name. They want you to answer as best you can, if you don't know the answer to any question, or you don't understand it, you must just tell me, and I will try to explain what they mean.

Abanye abantu abavela kwimfundo enomsila esemthatha benza izifundo zokutya okufunekayo nokusetyenziswa kwako ngabantu abahlala eTranskei. Ngokwenza ngoluhlobo benza uludwe lwezinto olo bafuna ukulufumana bandicela ukuba ndibancede ngokuba buzo imibuzo.

Ibalulekile into yokuba uqonde into yokuba akho ngozi inokuza kuwe xa uphendule lemibuzo, kuba andiyikuba nika amagama enu. Bafuna niba phendule ngokugqibeleleyo kangangoko ninako, ukuba awazi nanye imphendulo kule imbuzo, okanye akuwugondi, kwafuneka undazise mnalo, ndiya kwenza unako ukacacisela ukuba ithetha ntoni lemibuzo.

SECTION ONE: CROP PRODUCTION AND UTILIZATION

1. What crops do you grow on your land?

Zityalo zini enithi nizilime emasimini enu?

2. When are these crops planted?

Zilinywa nini ezizityalo?

3. Do your fields provide enough for your family, most years, or, do you have to buy from the trading store or your neighbours?

Ingaba amasimu enu amadla ngokwoneleyo na minyaka le na, okanye niya kuthenga evenkileni na, okanye kubamelwane?

4. Are you ever able to sell, or barter with, your crops?

Naya kuthengisa na, okanye nazitshintshisa ngazo?

Ewe/Hayi

If yes, how often are you able to do this?

Ukuba kunjalo, niyenza amaxesha amangaphi lonto?

Section One: Crop Production and Utilization (cont.)

5. Is there enough seed over for another planting, or is it bought from the trading store?

Ingaba ninayo imbewu eyaneleyo engoku gqithileyo eniza kuyilima, okanye nayi thenga evenkileni na?

6. Do you collect wild foods from the veld?

Niyakuqokelela ukutya akuqabukileyo okuvela emadlelweni?

Ewe/Hayi

If yes, what do you collect?. and, how often do you collect this food?

Ukuba kunjalo yintoni oyiqokelelayo? kwathona ukuqokelela nini okukutya?

SECTION TWO : LIVESTOCK UTILIZATION

1. Does your family have livestock?

Abantu bakawenu banayo imphahla efuyiweyo?

Ewe/Hayi

2. Do you eat this livestock?

Nikhe nazitya ezilwanyana nizifuyileyo?

Ewe/Hayi

If yes, which animals do you eat, and, how often?

Ukuba kunjalo, zeziphi izilwanyana enizityayo kwakhona amaxesha amangaphi?

3. Do you use the milk of cows and goats?

Ingaba niya busebenzisa ubisi lweenkomo nolweebhokhwe?

Ewe/Hayi

4. Do you sell meat or milk to other families?

Ingaba niya bathengisela abamelwane ubisi okanye inyama?

If yes, how often can you do this?, and, how much do you get for it?

Ukuba kunjalo, ninga yenza kanjani kangaphi lento kwakhona mfumana into engakanani ngayo?

SECTION THREE : ROCK FOOD UTILIZATION

1. Does your family collect food from the rocks?

Ingaba abantu bakuni bayakuqokelela okukutya kuphakathi kwamatye?

Ewe/Hayi

2. How many people from your family collect this food?

Bangaphi abantu abaqokelela okukutya kowenu?

3. How often do you collect this food?

Nikuqokelela amaxesha amangaphi na okukutya?

4. Do you collect just enough for your family, or, do you collect as much as as you can, at one time?

Niqokelela ukutya okwaneleyo nobantu bonke bakuni na, okanye, niqokelela kangangoko ninako?

5. How many people does one collection, from a single person, feed?

Ingaba bangaphi abantu abonelelayo xa kuqokelelwe kwakanye kuko?

Section Three : Rock Food Utilization (cont.)

6. What "animals" do you collect?

Ziziphi izilwanyana emiziqokelelwyo?

7. How is this food cooked?

Kuphekwe njani okukutya?

8. If someone offered you money, or some other food e.g. bread or mielie meal, for the food you had collected, would you take it?

Ukuba ngaba omnye umuntu ukunika imali, umzekelo okanye ukutya, okanye isonka, okanye umgubo, wombhona ngokukutya okugokeleleyo unokuwuthatha na?

Ewe/Hayi

If yes, which would you prefer money or some other food type?

Ukuba kunjalo, ingaba ukhetha imali, okanye, impinda yenye inmoboyokutya?

9. How much money do you get, when you sell what you have collected?

Ingaba nifumana malini xa nithe nazithengisa ezonto niziqokelelyo?

Section Three : Rock Food Utilization (cont.)

10. For how many years have you collected from the rocks?

Niqokelela iminyaka emingaphi okukutya kusematyeni?

11. Have you noticed any changes, i.e. are the animals becoming fewer or smaller than they used to be?

Ingaba kukho umahluko eniwubonileyo na, umzekelo izilwanyana ziyacutheka, okanye, iya ibancinci kunokwanga phambile?

12. Why do you think there have been these changes?

Kutheni ucinga ukuba kukho umahluko?

13. Do you collect from the rocks especially for somebody else, i.e.

Does anyone pay you to collect for them, on a regular basis?

Niyela ukuya kuqokelelela omnye umntu qha ematyeni. Ingaba abanye bayanihlawula ngoku baqokelelela kwezondawo zimxinwa?

Ewe/Hayi

If yes, what is it that you must collect?

Ukuba kunjalo, yintoni le kufuneka niyiqokelele?

COASTAL USAGE SURVEY
KUSSTREEK BENUTTING ONDERSOEK

INSTRUCTIONS:

Please place an 'X' in the appropriate space, where this is applicable, unless otherwise instructed.

INSTRUKSIES

Plaas 'X' in die toepassende blokkie, tensy u anders gevra is.

A1	Male/Manlik <input style="width: 50px;" type="checkbox"/>	Female/Vroulike <input style="width: 50px;" type="checkbox"/>	Age/Ouderdom <input style="width: 50px;" type="checkbox"/>
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Occupation/Beroep _____

A2	Visitor to Transkei Besoeker aan die Transkei <input style="width: 50px;" type="checkbox"/>	Resident of Transkei Inwoner van die Transkei <input style="width: 50px;" type="checkbox"/>
----	--	--

A3 If a visitor, where do you come from? _____
Van waar kom u, indien u 'n Besoeker is?

A4 What kind of accommodation are you using?
Van watter soort verblyf maak u gebruik?

Hotel, Bungalow or hired cottage ☐
Hotel, hut or gehuurde huis

Own camp ☐
U eie kamp

Camping ☐
Kampering

Other (Please state)
Indien enige ander, vermeld asseblief _____

A5 How often do you visit the Transkei coast?
Hoe dikwels besoek u die kus van die Transkei?

First visit ☐
Eerste besoek

Once or twice a year ☐
Een of twee maal per jaar

Once a month ☐
Een maal per maand

More than once a month ☐
Meer as een maal per maand

Other (Please state)
Indien enige ander, vermeld asseblief _____

A6 What is the average length of your visits to the Transkei coast?
Hoe lank duur u besoeke aan die Transkei se kus?

Less than a week
Minder as 'n week

☐

One to two weeks
Een tot twee weke

☐

More than two weeks
Meer as twee weke

☐

B1 Which recreational activities do you partake in?
Watter soort ontspannings aktiwiteite beoefen u?

Skiboating
Ski

☐

Rock or surf fishing
Hengel (see)

☐

River Fishing
Hengel (rivier)

☐

Diving
Duik

☐

Spearfishing
Onderwater Hengel

☐

Boating or canoeing
Motorboot of kanoesport

☐

Swimming
Swem

☐

Hiking
Stap

☐

None of the above
Geen van die bogenoemde

☐

C1 If you are a camper;
Indien u 'n kampeerder is;

a Do you have a permit?
Besit u 'n permit?

Yes/Ja

No/Nee

b If no have you a reason for this?
Indien nie, is daar enige spesefieke rede daarvoor?

C2 How many days have you been camping for? _____
Vir hoeveel dae het u gekamp?

- C3 Has anyone come to check on your permit as yet?
 Het enige persoon probeer vastel of u in besit van 'n permit is?

Yes/Ja

No/Nee

- D1 If a Fisherman;
Indien u hengel;

- a) What type of bait do you use?
 Van watter soort aas maak u gebruik?

Rock bait (e.g. mussels, limpets or Red bait)
 Rots aas (BV. Mossels, Klipmossels of Rooi aas)

☐

Live bait
 Lewendige aas

☐

Prawn or sardine
 Seegarnaal of sardiens

☐

Mud prawns
 Modder seegarnaal

☐

- b) With what frequency, on average, do you use each bait type?
 Hoe dikwels gebruik u die volgende aas soorte?

Bait type Aas soort	Frequency Frekwensie	Always Altyd	Often Dikwels	Seldom Soms	Never Nooit
Rock Bait Rots aas					
Live Bait Lewendige aas					
Prawns or Sardine Seegarnaal of Sardiens					
Mud Prawn Modder Seegarnaal					

- c) If you use 'Rock bait' what species do you most commonly use?
 Indien u van rots aas gebruik maak, watter tipe gebruik u die meeste?

- d) Do you collect this bait yourself?
 Kry u self hierdie aas in die hande?

Yes/Ja

No/Nee

E1 Do you collect mussels, oysters or crayfish for your own consumption (not for bait)?

Probeer u mossels, oesters of kreef vir u eie gebruik in die hande key, (nie vir die doeleindes van aas nie)?

Yes/Ja

No/Nee

E2 Do you buy mussels, oysters or crayfish from the local people? Koop u mossels, oesters or kreef van die plaaslike bevolking?

Yes/Ja

No/Nee

E3 If yes, what is the average price paid, per quantity (please state)? Indien ja, wat betaal u, per hoeveelheid (vermeld asseblief)?

Mussels _____
Mossels _____

Oysters _____
Oesters _____

Crayfish _____
Kreef _____

E4 Have you found it easy to obtain these food items, from the local people on your visits to the Transkei coast?

Was dit vir u relatief maklik om die bogenoemde seekos, van die plaaslike bevolking in die hande te key?

Yes/Ja

No/Nee

E5 What quantities of the following species is a person allowed to possess per day?

Hoeveel van die volgende spesies word h enkele persoon toegelaat om elke dag in die hande te kry?

Species Spesies	Quantity Hoeveelheid	Don't know Weet Nie	No Limit Geen Berking	Less than 5 Minder as 5	5	10-15	20-30
Mussels/Mossels							
Oysters/Oesters							
Crayfish/Kreef							
Octopus/Seekat							

E6 Which 'rock species' are subject to a closed season? and when is this closed season?
Watter rotssoorte is onderhewig aan spesifieke vang seisoene, en wanneer is hierdie vang seisoen gesluit?

Rock Species Rots soorte	Closed Season Vang Seisoen Gesluit	Nov-Jan	Dec-Feb	Jan-Jul	Aug-Sept

F1 What do you like most about the Transkei coast?
Waarvan hou u die meeste aan die Transkei se kus?

F2 Have you any comments on, or recommendations for conservation measures on the Transkei coast?
Het u enige opmerkings, of aanbeveling, ten opsigte van bewaringsmaatreëls aan die Transkei se kus?

21st June 1984

8 Alcis Str

Newlands

CAPE TOWN

7700

Dear Mr/Mrs

Re: Observed changes with regard to shellfood collecting on
the Wild Coast over the years.

I am conducting a study entitled: Rock Food Utilization
and its effect on the Rocky Shore Biota, On the Transkei Coast.

Information with regard to how collecting practices have changed
over the years. And, observed changes to the rocky shore animals
would be of great value to this study.

Your name was given, as one who had owned a camp on the Transkei
coast for many years. I would be most grateful, if you would
assist in this research by sharing your observations with me.

I have provided a form on which to record your comments, and
a form giving the type of information needed. I ask that your
answers be as detailed and specific as is possible ie. If possible
give approximate dates or distances.

This information is required rather urgently, and I would be
grateful if you would return the forms to me not later than
the 30th June 1984. (ie post on/before 30/6/84)

I urge you to help in the interest of conservation. Thanking
you in anticipation.

Fulls

Type of Information Required.

1(i). Sex: Do only the women collect for food or do the men as well?
Do only the men collect crayfish?

1(ii) Age: The general age range of collectors, and any change eg.
younger girls collecting?

1(iii) Numbers: Has there been an increase or decrease in numbers
of collectors? What do you attribute this to ie.
increase in population or coming from further away
to the rocks.

1(iv) Frequency: How many days before and after spring tides do the
locals collect.
Any collecting observed during neap tides.
Does the intensity of collection change as environmental
factors change eg. during times of drought.

2. Method of Collection: A brief description of the methods used
and any observed changes in method.

3. Sale of shellfish: Discuss points such as an increase or decrease
in the sale of shellfood. The major market etc. Has
this activity had any effect on the amount collected,
and the frequency of collection?

4. Changes observed on the rocky shore: Discuss with respect to
size (give approximate sizes if possible), and
numbers.
What role have commercial operations had to play in these
changes?
What role have 'natural' factors such as sanding had
to play?

NAME: _____

AREA IN WHICH CAMP IS SITUATED: _____

NUMBER OF YEARS VISITING THE CAMP: _____

FREQUENCY OF VISITS: _____

Section One: People Collecting.

(1) Sex

(2) Age

(3) Numbers

(4) Frequency

Section Two: Method of Collection

Section Three: Sale of Shellfood.

Section Four: Changes observed on the rocky shore.

APPENDIX TWO

Letter and sample Data Sheet sent to Camp Owners regarding the purchase of shellfish.

Correspondence with Transkei Development Corporation regarding the purchase of shellfish.

CGP|ts

Miss C G Pappin
Zoology Department
University of Transkei
Private Bag X5092
UMTATA
REPUBLIC OF TRANSKEI

9 September 1983

Dear Camp Owner

SHELLFOOD BOUGHT FROM THE INDIGENOUS TRANSKEI PEOPLE

I am currently registered for a Masters Degree with the University of Cape Town, School of Environmental Studies. This degree involves the completion of a thesis, and I have chosen as my thesis, "A study of the Shellfood Utilization on the Transkei Coast".

The study is a very broad one, with one of the major aims being to asses the role of shellfood in the diet and economy of the indigenous people. It is in this respect that I ask for your help and co-operation.

What I would like you to do is to simply record each time you purchase shellfish from the local people, the following information.

1. Date of purchase.
2. Quantity bought - can be stated as eg 2 bowls of mussels, 5 crayfish or 2 doz. oysters.
3. How many locals were involved in the sale, and whether, these were specifically requested by you to collect or were they voluntarily offered for sale.
4. How much money was paid for the various shellfood.

This information is to be recorded on the data sheets provided and supplied within.

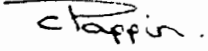
On completion of the data sheets, or at the end of the December vacation, I would be grateful if you would return the data sheets to me in the reply envelope provided. Postage has been paid by myself on these envelopes.

I am well aware of the current legislation with regard to the sale and purchase of shellfish and therefore have designed the program in such a way as to ensure the strictest confidentiality. No names need be supplied on any forms.

I would also appreciate greatly any information you could supply with regard to the shellfood utilization, for example, changes in the nature of exploitation over the years, attitudes of the local people towards the sea, etc.

The results of this thesis will be made available to the Transkeian Government for use in planning and conservation of the coastal zone. Thus your help and support would be most valuable in all respects. If you have any queries regarding the project, I will be happy to answer them and can be contacted at the above address.

Yours sincerely

A handwritten signature in cursive script, appearing to read "C. G. Pappin".

MISS C G PAPPIN

RECORD OF SHELLFOOD PURCHASED

AREA: Southern [Kei to Bashee]
 Central [Bashee to Mzimvubu]
 Northern [Mzimvubu to Mzamba]

	MUSSELS	CRAYFISH	OYSTERS	OTHER PLEASE SPECIFY EACH TIME
Date of Purchase				
Number of sellers [Male or Female]				
Was the shellfish a) specifically collected b) voluntarily offered				
Amount paid				
Quantity Purchased				

How often on average do you visit the Coast per year?

.....

What is the average length of stay?

.....

CGP|ts

TEL NO: [b] 2151 ext 362

8 Protea Street
Fort Gale
UMTATA
REPUBLIC OF TRANSKEI

18 August 1983

Mr M Kerr
Transkei Development Corporation Ltd
P O Box 103
UMTATA
REPUBLIC OF TRANSKEI

Dear Mr Kerr

SHELLFISH BOUGHT BY THE TDC HOTELS

I am currently registered for a Masters Degree with the University of Cape Town, School of Environmental Studies. This degree involves the completion of a thesis, as well as course work. My thesis is entitled "Rock Food Utilization, and its effect on the Community Structure of Rocky Shore Biota, on the Transkei Coast." The thesis is under the supervision of Prof J R Grindley of the School of Environmental Studies.

Following our conversations by telephone on Thursday, 4 August 1983, and Monday, 14 August 1983, with regard to shellfish use by the Coastal Resorts. I supply the details of the information I would require from the hotel managers.

At each purchase of shellfish, I would like the following data recorded:

1. Date of purchase
2. Quantity bought, this would involve recording the "wet weight" before cooking, as well as a collection of the used shells.
3. How many locals were involved in the sale, and whether these were specifically asked by the Hotel to collect, or was the shellfish offered voluntarily.
4. How much money was paid for the shellfish.

I am only interested in the intertidal species and therefore would not require information on crayfish or the sub-tidal oyster.

For the collection of data, I will supply each Manager with a book in which to record the above and black bags with labels in which to deposit the shells after they have been dried in the sun.

I am well aware of the current legislation with regard to the sale and purchase of shellfish and therefore will treat all information supplied as highly confidential.

No Hotel Names need to be mentioned as the coast could be divided into Northern, Central and Southern regions, in addition this data could [if it is so felt by the Corporation] be published with the data obtained from camp owners, under one title.

This information is important for a number of reasons, the prime reason being, to assess the role of shellfish in the local economy.

In order to get this programme underway, all that would be needed is a letter of authority from the Corporation to the Hotel Managers, explaining what information is required. This letter, together with the data books and black bags, could then be circulated to each Hotel Manager. The black bags could be collected personally by myself, or to ensure even greater confidentiality, the bags could be brought to Umtata by the Manager or his wife when they come through to Head Office. I could simply go and fetch the bags which would be labeled stating time period over which shells were collected and the region in which the Hotel is situated.

I expect the program to run from now until the end of December 1983.

I would greatly appreciate any comments you have in this matter and trust that the data would be of use to the Corporation.

I look forward to hearing from you at your earliest possible convenience.

Yours sincerely



Miss C G PAPPIN

PS : Enclosed is a copy of the "Coastal usage Questionnaire" which I have asked the Hotel Managers to give to their guests to complete.

ph. 2151 ext. 362

Zoology Department
University of Transkei
Private Bag X 5092
UMTATA

TRANSKEI

22nd November 1983

The Project Manager

Dear Sir

Coastal Usage Survey

This is an urgent reminder to all managerial staff, of Transkei Coastal Resorts, to ensure the completion of the survey forms issued in September 1983. The response thus far has been disappointing. It would be greatly appreciated if you would actively encourage each guest to complete a survey form. These are to be returned to me, via Central Reservations Umtata, by the 15th December 1983.

The detailed records of shellfish purchases from the indigenous Transkei people, are to be returned, together with any comments and/or observations made in this regard, by the 15th January 1984.

Your co-operation and support in these matters will be greatly appreciated. All data collected will be used to the benefit of the Transkei Coast as a whole.

Yours Sincerely

C.G.FAPPIN

APPENDIX THREE

Sea Fisheries Act 58, of 1973

Sea Shore Act 17, of 1979

Relevant sections of Sea Fisheries
legislation

Application Form for Commercial Fishing

Act No. 58, 1973

SEA FISHERIES ACT, 1973.

ACT

To provide for the control of sea fisheries and for matters connected therewith.

(English text signed by the State President.)

(Assented to 13th June, 1973.)

BE IT ENACTED by the State President, the Senate and the House of Assembly of the Republic of South Africa, as follows:—

Definitions.

1. In this Act, unless the context otherwise indicates—

- (i) "advisory council" means the Fisheries Advisory Council established under section 2 or, if such a council has been established for the Republic and such a council has been established for the territory, means, with reference to any matter in the Republic, the advisory council established for the Republic and, with reference to any matter in the territory, the advisory council established for the territory; (i)
- (ii) "catch" means take out of the sea or out of or from the sea-shore in any manner whatsoever, possess in a net, whether or not the net is in the water, possess in or on a boat, or land; (xxiv)
- (iii) "director" means the Director of Sea Fisheries; (iii)
- (iv) "factory" means any premises, vehicle or vessel on or in which any fish or fish products are salted, dried, smoked, frozen or canned or otherwise treated, or rock lobster is kept in captivity for purposes of trade, but does not include any hotel, boarding house, restaurant, refreshment or tea room or eating house or a fishing boat on which fish which has been caught off such fishing boat is only gutted, salted or chilled for the preservation thereof; (iv)
- (v) "fish" means any species of sea animal, whether vertebrate or invertebrate, and includes the spawn or larvae of any such sea animal, but does not include any seal or sea-bird; (xxv)
- (vi) "fisherman" means any person who catches or attempts to catch for purposes of trade any fish, whether found in the sea or in or on the sea-shore, and includes any person assisting him in doing so; (xxvi)
- (vii) "fishing boat" means any boat or other vessel, irrespective of the size or the manner of propulsion or movement thereof, used in any manner for the catching or processing of fish for purposes of trade; (xxvii)
- (viii) "fishing harbour" means any fishing harbour contemplated in section 4; (xxviii)
- (ix) "fishing zone" means the territorial waters of the Republic and the fishing zone as defined in sections 2 and 3, respectively, of the Territorial Waters Act, 1963 (Act No. 87 of 1963); (xxix)
- (x) "high-water mark" means the highest mark reached by the water of the sea on the land during ordinary sea storms during the most stormy period of the year; (x)
- (xi) "implement" means any net or other apparatus or device used for or in the course of the catching of fish; (xxxi)
- (xii) "inspector" means any person appointed under section 5 (1) as sea fisheries inspector or under the Public Service Act, 1957 (Act No. 54 of 1957), to a post

Act No. 58, 1973.

SEA FISHERIES ACT, 1973.

of fisheries inspector in the Department of Industries;
(xi)

- (xiii) "local authority" means any institution or body contemplated in section 84 (1) (f) of the Republic of South Africa Constitution Act, 1961 (Act No. 32 of 1961), and includes the South African Bantu Trust established by section 4 of the Bantu Trust and Land Act, 1936 (Act No. 18 of 1936), the Natal Parks, Game and Fish Preservation Board established under the Natal Parks, Game and Fish Preservation Ordinance, 1947 (Ordinance No. 35 of 1947 of Natal), and the National Parks Board of Trustees established under section 5 of the National Parks Act, 1962 (Act No. 42 of 1962); (xv)
- (xiv) "low-water mark" means the lowest mark on the land to which the water of the sea recedes with ordinary spring tide; (xiii)
- (xv) "master" means any person having command or control of a fishing boat or other vessel; (vi)
- (xvi) "Minister" means the Minister of Economic Affairs; (xiv)
- (xvii) "officer" means any person appointed under the Public Service Act, 1957 (Act No. 54 of 1957), to the public service; (ii)
- (xviii) "prescribe" means prescribe by regulation; (xxx)
- (xix) "regulation" means a regulation made under this Act; (xvi)
- (xx) "Republic" includes the territory of South West Africa; (xvii)
- (xxi) "salt" means any kind of salt occurring naturally in the water of the sea; (xxii)
- (xxii) "sea" means the water and the bed of the sea, including the water and the beds of tidal rivers and tidal lagoons; (xviii)
- (xxiii) "sea-shore" means the water and the land between the low-water mark and the high-water mark; (xxiii)
- (xxiv) "sea-weed" means any kind of sea-weed or algae found in the sea or on the sea-shore; (xix)
- (xxv) "Secretary" means the Secretary for Industries; (xx)
- (xxvi) "shell" means the shell or portion of the shell of any sea animal found in the sea or on the sea-shore; (xxi)
- (xxvii) "territory" means the territory of South West Africa; (v)
- (xxviii) "this Act" includes any regulation or notice made or issued thereunder; (ix)
- (xxix) "tidal lagoon" means any lagoon in which a rise and fall of the water-level takes place as a result of the tides; (viii)
- (xxx) "tidal river" means that part of any river in which a rise and fall of the water-level takes place as a result of the tides; (vii)
- (xxxi) "year" means any period of twelve months. (xii)

Appointment of
fisheries advisory
council or councils.

2. (1) The Minister shall establish a Fisheries Advisory Council or, according as he may deem fit, such a council for the Republic (excluding the territory) as well as such a council for the territory, and such a council shall advise the Minister on all matters in which he is, in terms of this Act, required to consult the advisory council, and on such other matters as the Minister may refer to it.

(2) A council referred to in subsection (1) shall consist of the Secretary or his authorized representative, who shall be the chairman, the director and so many other members, not being less than nine, as the Minister may appoint, and of whom—

- (a) two shall be appointed on account of their knowledge of the fisheries science or industrial economics; and
- (b) the others shall represent the interests of—

Act No. 58, 1973

SEA FISHERIES ACT, 1973.

- (i) the Fisheries Development Corporation of South Africa, Limited, established by section 2 of the Fishing Industry Development Act, 1944 (Act No. 44 of 1944);
- (ii) the South African Bureau of Standards mentioned in section 2 of the Standards Act, 1962 (Act No. 33 of 1962);
- (iii) the distributors of fish;
- (iv) persons engaged in trawling;
- (v) persons concerned in the pelagic fish industry;
- (vi) persons concerned in the rock lobster industry;
- (vii) persons concerned in the catching or processing of fish other than trawl-fish, pelagic fish and rock lobster;
- (viii) such other persons as the Minister may determine.

(3) If the Minister intends to appoint any person to any such council to represent the interests of any particular persons and there exists or exist a body or bodies which in his opinion is or are representative of those persons, he shall first consult such body or bodies.

(4) A member of any such council appointed by the Minister shall hold office for such period and on such conditions as the Minister may in consultation with the Minister of Finance determine: Provided that the Minister may at any time terminate the appointment of any such member if he is of the opinion that such member is unfit to represent the interests which he is required to represent.

(5) The Minister may from time to time and for such period as he may determine and on such conditions as he may in consultation with the Minister of Finance determine, appoint any person to assist any such council in an advisory capacity.

(6) The Fisheries Development Advisory Council established by section 21 of the Fishing Industry Development Act, 1944, and the Fisheries Development Advisory Board established under section 16 of the Sealing and Fisheries Ordinance, 1949 (Ordinance No. 12 of 1949 of the territory), shall be deemed to have been established for the Republic (excluding the territory) and the territory, respectively, and shall continue to exist until they are dissolved by the Minister.

Appointment
of advisory
committees.

3. (1) The Minister may appoint committees to advise the director on the issuing of any authority under section 8 (3).

(2) Different committees may be so appointed in respect of different species of fish.

(3) The constitution of any such committee and the procedure to be followed in the performance of its functions shall be as prescribed.

(4) The provisions of section 2 (4) shall *mutatis mutandis* apply in respect of the members of any such committee.

Establishment of
fishing harbours.

4. Subject to the provisions of any other laws the Minister may by notice in the *Gazette* declare a harbour or a specified portion of a harbour or a specified area or portion of the sea and the sea-shore to be a fishing harbour.

Appointment of
honorary fisheries
officers and
fisheries inspectors.

5. (1) The Minister may appoint honorary fisheries officers and, subject to the laws governing the public service, officers as sea fisheries inspectors.

(2) Any person appointed in terms of subsection (1) shall be furnished by the Secretary with a certificate of appointment, and whenever such person exercises any power or performs any duty or function in terms of this Act, he shall, at the request of any person affected thereby, produce that certificate to such person for inspection.

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SEA FISHERIES ACT, 1973.

Powers of
inspectors, officers,
members of the
Police and
honorary fisheries
officers.

6. (1) An inspector, an officer generally or specially authorized thereto by the Minister, and a member of the Police may—

- (a) board any fishing boat, enter any factory or any premises used for the storage or sale of fish, fish products, sea-weed, shells or salt and enter any vehicle used for the conveyance or sale of fish, fish products, sea-weed, shells or salt, and perform on such boat, premises or vehicle or in that factory such acts as may be necessary to ascertain whether the provisions of this Act are being complied with;
- (b) examine any implement which he has reasonable grounds to suspect is being used or intended for use in the catching or handling of fish, or the gathering of sea-weed or shells or the recovery of salt;
- (c) subject to the provisions of subsection (3), if he has reasonable grounds to suspect that an offence in terms of this Act has been committed in respect of any fish, sea-weed, shells or salt or has been or is about to be committed in respect of or by means of any implement, and that such fish, sea-weed, shells salt or implement is upon any premises or at any place or upon any fishing boat or vehicle or in any factory, at any time enter upon and search such premises, place, fishing boat, vehicle or factory, and search any person thereupon or therein, and seize any such fish, sea-weed, shells, salt, implement, fishing boat or vehicle, as well as any books or other documents on such premises, place, fishing boat or vehicle or in such factory;
- (d) if he has reasonable grounds to suspect that any fishing boat, factory, premises or vehicle has been or is being used in connection with any offence in terms of this Act, or that any fish, sea-weed, shells, salt or implement as to which there are reasonable grounds for suspecting that an offence in terms of this Act has been committed in respect thereof or by means thereof, is or has been on any fishing boat, vehicle or premises or in any factory, require the persons on such fishing boat, vehicle or premises or in such factory to furnish him with their names and addresses or require the licensee of such fishing boat to furnish him with the names and addresses of the master and of the members of the crew of such fishing boat;
- (e) by a prescribed signal order the master of a fishing boat to stop such boat or to sail to a harbour indicated by the inspector, officer or member of the Police;
- (f) order the master of a fishing boat to remove it at a specified time from a fishing harbour or not to bring it into a fishing harbour—
 - (i) if the fishing boat is such a fishing boat as is contemplated in section 10 (1) (d); or
 - (ii) if, irrespective of where the fishing boat is registered, any person who is or at any time was a member of the crew of such fishing boat, was at any time convicted, in terms of a law which is or was in force in the Republic, of any offence committed on such fishing boat while it was within the fishing zone; or
 - (iii) if, irrespective of where the fishing boat is registered, the inspector, officer or member of the Police is satisfied, upon reasonable grounds, that such fishing boat was at any time used within the fishing zone in connection with activities that constituted an offence in terms of any law;

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- (g) question any person who, in his opinion, may be capable of furnishing any information which he may require, and for that purpose require a fishing boat or other vessel or a vehicle to be stopped;
 - (h) require any person to produce to him any invoices, delivery notes or other documents in his possession in connection with any fish which is or in his opinion may be the subject of any criminal case in terms of this Act, and in his discretion seize such invoices, notes or other documents for production to and disposal of by a court;
 - (i) require any person employed on or at a fishing boat, vehicle or factory, to assist him in the examination of any container, implement or fish on such fishing boat or vehicle or in such factory to ascertain whether the provisions of this Act have been complied with in connection therewith.
- (2) An inspector or an officer shall in the exercise of his powers under subsection (1) be deemed to be a peace officer as defined in section 1 of the Criminal Procedure Act, 1955 (Act No. 56 of 1955).
- (3) Whenever any inspector, officer or member of the Police exercises any of his powers under this section, he may enter or search a dwelling in accordance with the provisions of the Criminal Procedure Act, 1955, only.
- (4) An honorary fisheries officer shall have the powers contemplated in subsection (1) (b) and (d) and he may also require any person who he knows or on reasonable grounds suspects—
- (a) has committed any offence in terms of this Act; or
 - (b) has at his disposal information in connection with the commission or suspected commission of any such offence,
- to furnish him with his name and address.
- (5) The powers conferred by subsection (1) may, in respect of any fishing boat licensed in terms of this Act or any boat used as a fishing boat in the fishing zone and in respect of any person or any fish or implement thereon, be exercised also outside the fishing zone.
- (6) Any fish, sea-weed, shells, salt or implement seized under subsection (1) (c) shall be forfeited to the State: Provided that—
- (a) in the event of the fish, sea-weed, shells, salt or implement forming the subject of a prosecution, the court may set aside the forfeiture; and
 - (b) in any other case the Minister may set aside the forfeiture, if the owner of the fish, sea-weed, shells, salt or implement, as the case may be, satisfies the Minister, within thirty days after the seizure, that no offence was committed by him or by any other person with his knowledge and consent, in respect of the fish, sea-weed, shells or salt or by means of the implement:
- Provided further that any fish so seized may be sold or destroyed at any time after the seizure, and if the forfeiture is set aside in terms of paragraph (a) or (b), the proceeds of the sale (if any) shall be handed over to the owner.

Registration of fishing boats and cancellation or suspension of registration thereof.

7. (1) Any person desiring to register a boat in respect of any particular fishing harbour, area or place, shall in the prescribed manner apply to the director for such registration and submit to the director, together with his application, proof of the facts advanced in support of his application.

(2) Subject to the provisions of subsection (3) the director shall grant an application in terms of subsection (1) if he is satisfied that the applicant is the owner of the boat in question and that the boat is registered or licensed under the Merchant Shipping Act, 1951 (Act No. 57 of 1951): Provided that the director may refuse to grant any such application if—

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- (a) he is satisfied that any information furnished by the applicant in his application is not correct;
 - (b) the registration of the boat concerned has been cancelled under subsection (6) or (7); or
 - (c) he is satisfied that such boat is not intended as a fishing boat.
- (3) If the Minister is satisfied that—
- (a) it is in the interests of the fishing industry that the further registration of boats generally or in respect of any particular area or place should not be allowed, or that the harbour facilities in any particular fishing harbour are inadequate for more boats than those already making use of such fishing harbour, or that the harbour, landing, storage or handling facilities in a particular fishing harbour are inadequate to deal satisfactorily with more than the catches off the boats already making use of that harbour, he may direct the director not to register any further boats, either generally or (as the case may be) in respect of that area, place or fishing harbour; and
 - (b) the reason for any direction under paragraph (a) no longer exists, he shall withdraw the direction.
- (4) (a) Whenever the director registers a boat under this section, he shall assign a registration letter and number to that boat.
- (b) The owner of a boat registered under this section, shall affix and keep affixed on such boat in the prescribed manner the registration letter and number assigned to that boat in terms of paragraph (a).
- (5) If the owner of a boat registered under this section changes his name or address, or alters the boat in such manner that the description thereof in the register is incorrect, he shall within twenty-one days thereafter and in the prescribed manner furnish the director with full information concerning it.
- (6) If the owner of a boat fails to comply with the provisions of subsection (5), or without the approval of the director alienates the boat or grants any right to any other person in respect thereof, or ceases to use the boat as a fishing boat, the director shall cancel the registration of the boat.
- (7) The director may in the case of a second or subsequent conviction of the owner of a boat or any other person of any offence under this Act in respect of a boat, cancel or, for such period as he may deem fit, suspend the registration of the boat.
- (8) Whenever the registration of a boat is cancelled or suspended for any period, any licence issued in respect thereof in terms of section 8 shall lapse or, as the case may be, be suspended for the same period.

Licences in respect of boats, factories and implements, and prohibitions in connection therewith.

8. (1) No person shall use any boat as a fishing boat or any premises, vehicle or vessel as a factory unless it is licensed under this section.

(2) Any person desiring to use any boat as a fishing boat or any premises, vehicle or vessel as a factory, shall in the prescribed manner apply to the director for authority for the issue to him of a licence therefor.

(3) (a) The director shall, subject to the provisions of subsection (5) and the regulations, grant the application and issue to the applicant the necessary authority in the prescribed form, provided, in the case of a boat, it is registered under section 7.

(b) If any authority has been issued to a person in terms of paragraph (a), he shall, on payment of the prescribed fee to the prescribed person, be entitled to the issue of the licence to him.

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(4) If the Minister is satisfied that a boat is registered in a foreign country, he may, on application by the owner thereof, direct the director to issue an authority for the issue in respect of that boat of a licence for such period as the Minister may determine.

(5) A licence shall be issued subject to such conditions and restrictions as the director may have specified in the authority concerned: Provided that a condition or restriction that a boat may not be used for the catching of fish belonging to a particular species or to particular species, shall not be imposed except upon the recommendation of a committee appointed under section 3.

(6) If the Minister deems it necessary in the interests of the fishing industry, he may by regulation provide that a specified kind of implement may not be used for the catching of fish belonging to a particular species or to particular species, unless it is licensed in accordance with the regulations.

Appeals.

9. Any decision of the director in terms of section 7 or 8 shall be subject to an appeal to the Minister in the manner prescribed.

Protection of fish and restrictions on landing of fish and supplying of ships' stores.

10. (1) The Minister may by notice in the *Gazette* make regulations—

- (a) prohibiting for an indefinite period or for a specified period in any year, and either generally or in a specified area, the catching or disturbing of fish or fish belonging to a specified species, or the catching or disturbing of any such fish by a specified person or persons belonging to a specified category or any person other than a specified person or persons belonging to a specified category;
- (b) prohibiting the landing of fish or fish belonging to a specified species in any specified area at any place other than a specified place;
- (c) prohibiting the conveyance or the removal from one place to another of any fish or fish products without the written authority of the director and otherwise than subject to such conditions as he may determine;
- (d) prohibiting the supply of ships' stores, excluding medical supplies, to specified fishing boats, or fishing boats registered in specified foreign countries, or imposing a levy for the benefit of the Consolidated Revenue Fund on such stores supplied to such fishing boats, and prescribing how and by whom any such levy shall be collected.

(2) Regulations under subsection (1) (b) and (c) may grant exemption from the provisions thereof in respect of specified quantities of fish caught by any person for his own use.

Restrictions in respect of quantities of fish which may be caught or processed.

11. The Minister may, after he has consulted the advisory council, by notice in the *Gazette* make regulations—

- (a) prohibiting the holders of licences in respect of fishing boats or any particular holder of such a licence from catching or landing, either generally or in any particular area, in the course of a specified year or any particular portion of a year, a greater quantity of fish, or of fish belonging to a particular species, than a quantity specified;
- (b) prohibiting or regulating the supply of any fish or of fish belonging to a particular species, or the products thereof, to any person or class of persons either generally or in any particular area, irrespective of whether the fish is supplied by any person who caught the fish or acquired it from some other person;

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- (c) prohibiting any factory or any particular factory from receiving or manufacturing in the course of a specified year or any particular portion of a year a greater quantity of any fish, or of fish belonging to a particular species, or of any specified product thereof, than a quantity specified;
- (d) prohibiting the director from issuing more than a specified number of licences in respect of factories, and restricting, either generally or in a particular area, the number and capacity of appliances that may be used in a factory for the packing, treatment or canning of fish belonging to a particular species, or for the manufacture of any particular kind of fish products;
- (e) prohibiting any person, or persons belonging to a particular category of persons, from using, either generally or in any particular area, and outside any period referred to in section 10 (1) (a), any fishing boat or other vessel for the catching or processing of fish belonging to a particular species or for the manufacture of products thereof.

Control over removal of sea-weed and shells and recovery of salt from the sea.

12. (1) The Minister may—

- (a) notwithstanding the provisions of the Sea-shore Act, 1935 (Act No. 21 of 1935), or any other law, exercise control over the removal of sea-weed and shells from the sea or the sea-shore, and over the recovery of salt from the sea;
- (b) on such conditions as he may think fit and on payment of such consideration as he may determine, issue permits for the removal of sea-weed and shells from the sea or the sea-shore, and for the recovery of salt from the sea: Provided that the Minister—
 - (i) shall, before issuing a permit in terms of this section in respect of an area situated in or abutting upon the area of jurisdiction of a local authority, consult such local authority;
 - (ii) if he is of opinion that the issuing of a permit in terms of this section will encroach upon the enjoyment of the sea-shore or the sea by the general public or upon the rights of any interested person, shall, at least one month before issuing such permit, cause a notice wherein the intention to do so is made known, to be published in the *Gazette* and in at least one newspaper circulating in the area in which the portion of the sea-shore or the sea in question is situated.

(2) No person shall remove or cause to be removed any sea-weed or shells from the sea or the sea-shore, except for his own use and in quantities not exceeding ten kilograms of sea-weed and one kilogram of shells per day, or recover, or cause to be recovered, any salt from the sea, without being in possession of a permit issued in terms of this section, and otherwise than in accordance with the conditions subject to which such permit was issued.

(3) A permit, concession or agreement in respect of the removal of sea-weed and shells from the sea or the sea-shore, or the recovery of salt from the sea; or any delegation of a power to a local authority in connection therewith under the provisions of the Sea-shore Act, 1935, or the Sea Fisheries Act, 1940 (Act No. 10 of 1940), and which is still in force, shall be deemed to be respectively a permit or delegation issued or made in terms of this Act.

Regulations

13. (1) The Minister may by notice in the *Gazette* make regulations—

- (a) prohibiting the use of any particular kind of implement for the catching of fish, or fish belonging to any particular species, unless a licence in respect thereof has

been obtained from the director, and prescribing the manner in which application for any such licence shall be made;

- (b) prescribing the form of licences, permits and other documents required for the administration of this Act, the conditions subject to which they may or shall be issued or renewed, the periods for which they shall be valid and, after consultation with the Minister of Finance, the fees or other charges which shall be paid in connection therewith;
- (c) prescribing the nature and construction of nets and other implements or contrivances which may or shall be used for the catching of fish or the weighing thereof at factories;
- (d) prescribing the methods by which fish may be caught;
- (e) prohibiting any person from catching for his own use more fish than a specified number or a specified quantity by mass;
- (f) prescribing how the size of any fish shall for the purposes of this Act be determined;
- (g) prohibiting or regulating the dumping in the sea of any particular substances or materials or any substances or materials not complying with specified requirements or having specified properties;
- (h) prescribing the manner of the erection, maintenance, use and protection of and control over, boundary beacons, buoys, notices, notice boards or other marks used in connection with the catching or protection of fish;
- (i) prescribing the circumstances in which fish that has been caught shall be or may not be returned to the sea;
- (j) providing for the disposal of fish seized or forfeited or declared forfeited in terms of this Act;
- (k) regulating the control and management of any fishing harbour and, after consultation with the Minister of Finance, prescribing the fees payable for the use of a fishing harbour or the facilities therein;
- (l) regulating, controlling or prohibiting the use of a fishing harbour or any part thereof by any boats or vessels other than boats registered in terms of this Act;
- (m) prohibiting any fishing boats or other vessels registered in specified foreign states or belonging to specified foreign states or the citizens thereof, or in which such states or citizens have a controlling interest or which are hired by them, from entering fishing harbours;
- (n) prohibiting, regulating or prescribing the matters which in terms of this Act are required or permitted to be prohibited, regulated or prescribed by regulation or which he considers necessary for the further protection or preservation of fish or fish food.

(2) Different regulations may under subsection (1) be made in respect of different areas or in respect of different species of fish or fish products, and fees prescribed under paragraph (k) of the said subsection may differ in respect of boats registered under this Act and boats not so registered.

(3) Any regulations made under this section may prescribe for any contravention thereof or failure to comply therewith penalties not exceeding a fine of one thousand rand or imprisonment for a period of one year.

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Obtaining of
information by
Minister.

14. The Minister, or an officer authorized thereto by the Minister, may at any time and either by notice in the *Gazette* or by notice sent through the post, direct any person carrying on any business for the catching, conveyance, treating, processing, refrigeration, freezing or packing of fish or fish products, or the removal of sea-weed or shells or the recovery of salt from the sea, to furnish him within the period specified in the notice with such information in respect of that business as may be so specified and may be considered necessary for the purposes of the administration of the provisions of this Act.

Delegation of
powers, and
appeals in
connection
therewith.

15. (1) The Minister may by notice in the *Gazette* delegate, in respect of any specified species of fish or sea-weed, shells or salt, and either generally or in respect of any specified area, any power conferred upon him by this Act to any other person, including a local authority or body of persons.

(2) Any person to whom any power has been delegated under subsection (1) may with the written approval of the Minister delegate that power to any person to whom the Minister could have delegated it.

(3) No power shall be delegated under subsection (1) or (2) in respect of any area consisting of land contemplated in section 21 (1) of the Bantu Trust and Land Act, 1936 (Act No. 18 of 1936), or a scheduled Bantu area as defined in section 49 of the said Act, except with the written approval of the Minister of Bantu Administration and Development.

(4) A decision by any person by virtue of any power delegated to him under subsection (1) or (2) shall be subject to an appeal to the Minister in the prescribed manner.

Offences and
penalties.

16. (1) Any person who—

- (a) catches or kills fish by means of any poison or any stupefying substance;
- (b) catches or kills any fish, other than whales, by detonating any substance in the sea;
- (c) catches fish by means of any implement other than an implement prescribed in respect thereof;
- (d) catches fish by means of any method other than a method prescribed in respect thereof;
- (e) catches or has in his possession any fish the size of which is less than the size prescribed in respect thereof or which does not comply with the other biological requirements or characteristics prescribed in respect thereof;
- (f) possesses, sells or displays or offers for sale any fish the catching of which is prohibited in terms of this Act;
- (g) contravenes the provisions of any notice under section 10 or 11 or the provisions of section 7 (4) (b), 8 (1) or 12 (2);
- (h) returns to the sea or abandons in any other place any edible and marketable dead fish;
- (i) exports or imports any live fish, except in terms of a permit issued by the Minister or any officer authorized thereto by the Minister, and otherwise than in accordance with the conditions subject to which the permit was issued;
- (j) dumps in or allows to enter or permits to be dumped or discharged in the sea anything which is or may be injurious to fish, fish food or sea-weed, or which may disturb or change the ecological balance in any area of the sea, or which may detrimentally affect the marketability of fish or sea-weed, or which may hinder the catching of fish;
- (k) fails to comply with any requirement or order by a fisheries inspector, officer, member of the Police or honorary fisheries officer under this Act, or gives any false information in pursuance of such a requirement or order;

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- (l) resists or hinders any fisheries inspector, officer, member of the Police or honorary fisheries officer in the exercise of any power or the performance of any duty in terms of this Act;
- (m) falsely represents himself to be a fisheries inspector, an officer or an honorary fisheries inspector;
- (n) uses any fishing boat without the consent of the owner or the person having control thereof;
- (o) uses any fishing boat for the catching of fish at any place while any substance or implement which at that place may not be used for the catching or killing of fish is on such boat;
- (p) allows any fishing boat of which he is the owner to be used in contravention of the provisions of paragraph (o) or for the catching of fish in contravention of the provisions of this Act;
- (q) contravenes any provision of a notice under section 20 (2),

shall be guilty of an offence and on conviction liable to a fine not exceeding seven thousand five hundred rand or to imprisonment for a period not exceeding five years, or to both such fine and such imprisonment.

- (2) (a) Whenever any person is convicted of an offence in terms of this Act, the court shall summarily enquire into and determine the monetary value of any advantage which he may have gained in consequence of that offence, and, in addition to any other punishment that may be imposed in respect of that offence, impose a fine equal to the amount so determined and, in default of payment thereof, imprisonment for a period not exceeding one year.
- (b) A magistrate's court shall have jurisdiction to impose that additional penalty, even though that penalty may, either alone or together with any other punishment imposed by the court, exceed the punitive jurisdiction of a magistrate's court.

Forfeiture and seizure.

17. (1) The court convicting any person of an offence in terms of this Act may, in addition to any other penalty it may impose—

- (a) in the case of a first conviction, declare any fish, sea-weed, salt, shells or implement in respect of which the offence was committed or which was used in connection with the commission thereof, or any rights of the convicted person thereto, to be forfeited to the State; and
- (b) in the case of a second or subsequent conviction, also declare any fishing boat or other vessel or vehicle so used, or any rights of the convicted person thereto, to be forfeited to the State, and cancel, or suspend for such period as the court may think fit, any registration done in respect of the convicted person or any licence or permit issued or granted to him in terms of this Act:

Provided that such a declaration of forfeiture shall not affect any rights which any person other than the convicted person may have to such implement, boat, vessel or vehicle, if it is proved that he took all reasonable steps to prevent the use thereof in connection with the offence.

(2) The provisions of section 360 (4) and (5) of the Criminal Procedure Act, 1955 (Act No. 56 of 1955), shall *mutatis mutandis* apply in respect of any such rights.

(3) Any fish, sea-weed, shells, salt, boat, vessel, vehicle or implement or any right thereto forfeited to the State under the provisions of this section or section 6 (6), may be sold or destroyed or may be dealt with in such other manner as the Minister may direct.

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Jurisdiction
and evidence.

18. (1) If any person is charged with having committed any offence in terms of this Act on or in the sea, any court whose area of jurisdiction abuts on or includes any part of the sea, shall be competent to try the charge, and the offence shall, for all purposes connected with or consequential on the trial of the charge, be deemed to have been committed within the area of jurisdiction of that court.

(2) If any fishing boat or other vessel has been used in connection with any offence in terms of this Act, or any fish or implement in respect of or by means of which an offence in terms of this Act has been committed, is found or proved to have been upon any fishing boat or other vessel, any person who was on board such fishing boat or other vessel at the time when the offence was committed, shall be deemed to be guilty of that offence, unless he proves that he did not commit that offence and did not take part in and could not prevent the commission thereof.

(3) In any prosecution for a contravention of this Act—

- (a) based on any act alleged to have been performed in a particular area, the act in question shall be deemed to have been performed in such area;
- (b) any information obtained by means of any instrument or chart used to determine any distance or depth, shall be deemed to be correct,

unless the contrary is proved.

(4) If in any prosecution for an offence in terms of this Act it is proved that in any area in the sea within a distance of 8 kilometres from any factory any fish or fish food has been or is being injured or has died or is dying or the marketability thereof or of sea-weed has been or is being adversely affected, or the ecological balance has been or is being disturbed or changed, it shall be presumed, until the contrary is proved, that it has been or is being caused by something discharged from that factory into the sea.

(5) It shall be no defence in any prosecution for an offence in terms of this Act that the accused had no knowledge of some fact or other or did not act wilfully.

Establishment of
Sea Fisheries
Research Fund.

19. (1) There is hereby established a fund to be known as the Sea Fisheries Research Fund, into which shall be paid—

- (a) all unspent moneys received in terms of the following levies on fish in the territory for sea fisheries research and handed over to the Secretary on 1 April 1969, namely—
 - (i) the levies imposed by Government Notice No. 11 of 3 January 1966 of the territory; and
 - (ii) the levy of R5,00 per ton of pelagic fish paid by agreement between the fishing industry of the territory and the Administration thereof;
- (b) all unspent moneys received prior to, and all moneys received from, the commencement of this Act by the Fisheries Development Corporation of South Africa, Limited, in pursuance of the levy imposed by proclamation No. 69 of 1956;
- (c) all moneys received in pursuance of a levy imposed by section 20;
- (d) all moneys received by the Fund from any other source with the approval of the Minister granted in consultation with the Minister of Finance.

(2) The Secretary shall, subject to the provisions of this Act, be responsible for the administration of the Fund, including—

- (a) control over expenditure from the Fund; and
- (b) the collection, for the benefit of the Fund, of the moneys due or accruing to the Fund, and the prosecution of all claims in favour of the Fund in terms of this Act,

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and shall for the purposes of the Exchequer and Audit Act, 1956 (Act No. 23 of 1956), and the regulations made thereunder, be the accounting officer in relation to the affairs of the Fund.

(3) The moneys in the Fund shall be used to undertake or aid such sea fisheries research as the Minister may in consultation with the Minister of Finance and after consultation with the advisory council determine.

(4) Any moneys in the Fund which are not required for immediate use shall be invested with the Public Debt Commissioners and may be withdrawn when required for use.

(5) Any unexpended balance in the Fund at the end of any financial year shall be carried forward to the ensuing financial year as a credit in the Fund.

(6) The Controller and Auditor-General shall audit the books and accounts of the Fund.

Levy on fish.

20. (1) The Minister may after consultation with the advisory council and by notice in the *Gazette* impose on fish of any species specified in the notice, or any product thereof, which is landed by fishermen, a levy at such rate according to mass as he may deem fit, and may in any such notice—

- (a) differentiate between different species of fish or different products of fish or different persons or classes of persons in regard to the rate of the levy, and prescribe the circumstances in which any person or class of persons shall be liable for the payment of the levy;
- (b) prescribe the manner in which the mass of fish or products of fish shall be determined for the purposes of the calculation of the levy;
- (c) prescribe the persons by whom the levy shall be collected, the times when and the manner in which it shall be paid to those persons, and the times when the proceeds thereof shall be handed over by those persons to the Fund referred to in section 19;
- (d) differentiate between different areas;
- (e) grant exemption from payment of the levy in respect of fish or products of fish landed at a place or in an area specified in the notice, if the proceeds of the levy in respect thereof would, in his opinion, not justify the expenses of collecting the levy.

(2) The Minister may by notice in the *Gazette*—

- (a) direct any person who is liable for the payment of the levy to furnish the director, within a period specified in the notice, with his name and address and specified particulars concerning the fishing boat used by him and the crew thereof;
- (b) require any person who is liable for the payment of the levy to render returns to the director, and prescribe the form in which and the times when the returns shall be rendered, the particulars they shall contain and the statements which shall accompany them.

(3) Any levy payable under subsection (1) shall be a debt due to the Fund mentioned in section 19 and may be recovered by the Secretary in a competent court.

Limitation of liability.

21. (1) The State or any person in the service of the State, or the Minister, shall not be liable by virtue of anything done in good faith under the provisions of this Act.

(2) The State or any person in the service of the State, or the Minister, shall not be liable (except in the case of any wilful act or omission on the part of any such person) to any person who, except in the performance of any duty or function under this Act or any other law—

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- (a) makes use of any aircraft, vehicle, boat or other vessel which is the property or under the control of the State in its Department of Industries;
- (b) is present in any fishing harbour; or
- (c) leaves any boat or other vessel or any other property in a fishing harbour or makes use of the facilities of a fishing harbour,

or to the spouse or any dependant of any such person, for any loss or damage resulting from any bodily injury, loss of life or loss of or damage to any property caused by or arising out of or in any manner connected with the use of any aircraft, vehicle, boat or other vessel contemplated in paragraph (a), the presence contemplated in paragraph (b) or the presence of any property or the use of any facilities contemplated in paragraph (c).

Exemptions.

22. The Minister or any officer authorized thereto by the Minister may in writing exempt any officer or other person engaged in scientific work from any provision of this Act.

Circumstances under which Act does not apply.

23. (1) This Act shall not apply in respect of—

- (a) fish in any waters which do not at any time during the year form part of the sea;
- (b) fish in a tidal river above the highwater mark, unless the Minister has by notice in the *Gazette* and after consultation with the provincial administration concerned or, if a local authority in terms of any law exercises control over a tidal river above that mark, after consultation with that local authority, declared it to be applicable thereto;
- (c) the catching of fish in enclosed tidal lagoons, tidal rivers and estuaries along the coast of the province of Natal or from the said coast, excluding that part of the said coast in any area consisting of land contemplated in section 21 (1) of the Bantu Trust and Land Act, 1936 (Act No. 18 of 1936), or in any scheduled Bantu area as defined in section 49 of the said Act;
- (d) any area along the coast which has under section 2 of the National Parks Act, 1962 (Act No. 42 of 1962), been declared to be a national park or has under the Nature Conservation Ordinance, 1967 (Ordinance No. 31 of 1967 of the territory), been declared to be a game park and in respect of which the State President has by proclamation in the *Gazette* declared that the provisions thereof shall not apply.

(2) Any declaration under subsection (1) (b) may be made in respect of all rivers concerned or one or more rivers, and shall apply from the date specified in the notice concerned.

(3) In this section "catching" does not include the landing of fish caught outside such water or any such lagoon, river or estuary and otherwise than from the coast.

Application of Act.

24. (1) This Act and any amendment thereof shall also apply in the territory of South West Africa except in so far as it relates to salt.

(2) Any regulation, notice or prescription in terms of this Act may be declared to be applicable also outside the fishing zone in respect of any person on any fishing boat licensed in terms of this Act and on any boat used as a fishing boat within the fishing zone.

Repeal of laws and savings.

25. (1) Subject to the provisions of subsection (2) the Acts and the ordinances of the territory specified in the Schedule are hereby repealed.

(2) Any registration of, or any licence in respect of, any fishing boat, factory or implement and any permit or permission for the performance of any act in connection with fish under any

ACT

(Xhosa and English text signed by the President (Assented to on 27 September 1979))

To declare the State to be the owner of the sea-shore and the sea within the territorial waters of the Republic of Transkei; and to provide for the grant of rights in respect of the sea-shore and the sea, and for alienation of portions of the sea-shore and the sea and for matters incidental thereto.

Definitions.

1. In this Act, unless the context otherwise indicates -

- (i) "Gazette" means the Government Gazette of the Republic of Transkei;
- (ii) "high-water mark" means the highest line reached by the water of the sea during ordinary storms occurring during the most stormy period of the year, excluding exceptional or abnormal floods;
- (iii) "local authority" means a municipality and includes any other local institution of a similar nature;
- (iv) "low-water mark" means the lowest line to which the water of the sea recedes during periods of ordinary spring tides;
- (v) "Minister" means the Minister of Local Government and Land Tenure, but in relation to the sea-shore and the sea within any port or harbour which in terms of any law falls under the control and management of any other department, "Minister" means the Minister of that department;
- (vi) "sea" means the water and the bed of the sea below the low-water mark and within the territorial waters of the Republic of Transkei, including the water and the bed of any tidal river and of any tidal lagoon;
- (vii) "sea-shore" means the water and the land between the low-water mark and the high-water mark;
- (viii) "tidal lagoon" means any lagoon in which a rise and fall of the water-level takes place as a result of the action of the tides;
- (ix) "tidal river" means the part of any river in which a rise and fall of the water level takes place as a result of the action of the tides.

State is owner of the sea-shore and the sea. 2. (1) Subject to the provisions of this Act, the State shall be the owner of the sea-shore and the sea, except of any portion thereof which was lawfully alienated before the commencement of this Act or may be alienated hereafter under this Act or under any other law.

(2) Any portion of the sea-shore and the sea which was alienated before the commencement of this Act, shall be deemed to have been lawfully alienated.

(3) The sea-shore and the sea of which the State is the owner in terms of this section shall not be capable of being alienated or let except as provided by this Act or by any other law, and shall not be capable of being acquired by prescription.

Letting of sea-shore and the sea.

3. (1) The Minister may, on such conditions as he may deem expedient, let any portion of the sea-shore and the sea of which the State is in terms of section 2 the owner, for any of the following purposes: -

- (a) The erection of bathing boxes or tents;
- (b) the erection of beach shelters;
- (c) the erection of tea rooms and refreshment places;
- (d) the training of horses, the holding of races (including motor car and motor cycle races) and the provision of places for recreation, amusements or displays;
- (e) the provision of the landing sites for aircraft and the establishment of aerodromes;
- (f) the construction or improvement of wharves, piers, jetties and landing stages;
- (g) the construction of breakwaters, sea walls, promenades, embankments, esplanades, buildings or other structures;
- (h) the construction of bathing pools and enclosures;
- (i) the erection of whaling stations or fish-canning or other factories;
- (j) to legalize any encroachments;
- (k) the carrying out of any work of public utility;
- (l) the laying of drainage or sewerage systems;
- (m) the laying of water pipes or cables;
- (n) the erection of boathouses;
- (o) the carrying out of any work which in the opinion of the Minister serves a necessary or useful purpose:

Provided that in the opinion of the Minister such letting is either in interests of the general public or will not seriously affect the general public's enjoyment of the sea-shore and the sea.

(2) The Minister may, on such conditions as he may deem expedient and at such a consideration as he may determine, in consultation with the Minister of Finance, permit the removal of any material from the sea-shore and the sea of which the State is the owner in terms of section 2.

(3) The Minister may, by notice in the *Gazette*, delegate to any local authority, subject to such conditions as he may deem expedient, any of the powers vested in him by this section, and he may by a like notice withdraw any such delegation.

(4) Whenever any portion of the sea-shore or the sea in respect of which it is proposed to enter into any lease under subsection (1) or to grant any permit under subsection (2), is situated within or adjoins the area of jurisdiction of a local authority, the Minister shall first consult that local authority.

(5) Not less than one month before any lease is entered into under subsection (1) or any permit is granted under subsection (2), the Minister shall at the expense of the person with or to whom it is proposed to enter into such lease or to issue such permit, cause a notice wherein the proposal is made known, to be published in the *Gazette* and in not less than one newspaper circulating in the area wherein the portion of the sea-shore or the sea concerned is situated.

Letting or transfer of sea-shore and sea to local authority. 4. (1) The Minister may, on the conditions set out in subsection (2) and such further conditions as he may deem expedient after consultation with the Minister of Finance, let, sell or donate any portion of the sea-shore and the sea of which the State is the owner in terms of section 2, to any local authority.

(2) Any letting or alienation under subsection (1) shall take place subject to the conditions -

(a) that no right acquired under subsection (1) with regard to the sea-shore or the sea may be transferred to any person other than a local authority or the Government of the Republic of Transkei unless the prior approval thereto by resolution of the National Assembly is obtained: and

(b) that the Minister may at any time resume for Government or public purposes any right granted under subsection (1), subject to payment of such compensation for improvements as may be agreed upon or settled by arbitration.

(3) The provisions of section 3 shall apply *mutatis mutandis* to any letting or alienation under subsection (1).

Government may use the sea-shore and the sea. 5. (1) The Minister may authorize the use of any portion of the sea-shore and the sea of which the State is the owner in terms of section 2, for Government purposes.

(2) The Minister may cause any land in the sea or on the sea-shore to be reclaimed and such reclaimed land shall be State-owned land.

Approval of National Assembly. 6. (1) Any alienation, letting or permission with regard to the sea-shore or the sea which is not authorized elsewhere in this Act or in any other law, may only take place with the approval, by resolution, of the National Assembly.

(2) If an alienation, letting or permission in terms of subsection (1) is proposed with regard to any portion of the sea-shore or the sea situated within or adjoining the area of jurisdiction of a local authority, the Minister shall, before the proposal is submitted to the National Assembly, consult that local authority.

(3) Not less than one month before submitting to the National Assembly any proposal for an alienation, letting or permission in terms of subsection (1), the Minister shall at the expense of the person in whose favour the alienation, letting or permission is proposed cause a notice setting forth particulars of such proposal, to be published in the *Gazette* and in not less than one newspaper circulating in the neighbourhood in which the portion of the sea-shore or the sea concerned is situated.

(4) Except where it is provided otherwise in the relevant resolution referred to in subsection (1), the provisions of section 4(2)(a) and (b) shall apply *mutatis mutandis* to any alienation, letting or permission under subsection (1).

Exercise of powers for purposes of public health.

7. (1) Notwithstanding anything contained in the Public Health Act, 1919 (Act 36 of 1919), the President may by proclamation in the *Gazette* declare that any local authority may exercise, in respect of the sea-shore and the sea situated within its area of jurisdiction or adjoining such area, any of the powers which are conferred by or under that Act on a local authority.

(2) The power conferred by section 5 of the Public Health Act, 1919, Amendment Act, 1927 (Act 36 of 1927) on the Minister of Health or a Magistrate or a local authority, to delegate to certain persons or to a local authority a function or duty vested in or devolving upon him or it under the said Act, may be exercised as regards any function or duty which may vest or devolve upon him or it under the said Acts as regards any portion of the sea-shore or the sea.

(3) Any reference in the said Acts to a local authority shall for the purposes of this section be construed as a reference to a local authority as defined by this Act.

Application of mining laws.

8. The land of the sea-shore and the bed of the sea which in terms of section 2 belongs to the State, shall be State land for purposes of any law in force in any part of the Republic of Transkei relating to exploitation of metals, minerals, precious stones, coal or oil; and in the application of any such law, this section shall be deemed to have been in operation as from the commencement of such law.

Determination of position of high-water mark.

9. (1) (a) If privately-owned land has a boundary extending to or a stated distance from the high-water mark and it is in the public interest or in the interests of the owner of or the holder of the mineral rights in such land that the said boundary be replaced by another kind of boundary, the Surveyor-General may permit the first-mentioned boundary to be replaced by the last-mentioned boundary, provided the Minister, the owner of the land and the holder of the mineral rights have signed an agreement, as far as possible in the form of Form A contained in the Schedule to the Land Survey Act, 1978 (Act 19 of 1978), whereby they accept the new boundary.

(b) If the Minister, the owner of the land or the holder of the mineral rights fails to sign the agreement referred to in paragraph (a), the provisions of section 11(5) to (8), inclusive, of the Land Survey Act, 1978 shall *mutatis mutandis* apply.

(c) As soon as the agreement referred to in paragraph (a) has been approved by the Surveyor-General,

Survey-General, the new boundary shall, for the purposes of the Land Survey Act, 1978, be deemed to have been lawfully established in accordance with section 22 of the Act, and the boundary-line so established shall, in any case where the boundary extends to the high-water mark, be deemed to be the high-water mark as defined in this Act.

(2) (a) The Minister may, in respect of any State-owned land, cause a diagram to be prepared on which the seaward boundary of that State-owned land is established as near to the high-water mark as is possible according to the natural indications, and as soon as the diagram has been approved by the Survey-General, the beacons indicating the seaward boundary of the State-owned land shall for the purposes of the Land Survey Act, 1978 be deemed to be lawfully established in accordance with section 22 of that Act, and the boundary-line so established shall be deemed to be the high-water mark as defined in this Act: Provided that if the boundary of any privately-owned land is affected by the establishment of the said boundary-line, the provisions of section 12 of the said Act shall apply *mutatis mutandis* to such establishment.

(b) For the purposes of the application of section 12 of the Land Survey Act, 1978, in terms of the proviso to paragraph (a), "owner" includes the holder of the mineral rights.

Regulations.

10. (1) The Minister may make regulations, or by notice in the *Gazette* authorize any local authority, in regard to any portion of the sea-shore and the sea situated within or adjoining the area of jurisdiction of such local authority, with his approval to make regulations, not inconsistent with this Act -

- (a) concerning the use of the sea-shore;
- (b) concerning bathing in the sea;
- (c) concerning the removal of any material from the sea-shore and the sea;
- (d) for the prevention or the regulation of the depositing or the discharging upon the sea-shore or in the sea of offal, rubbish or anything liable to be a nuisance or danger to health;
- (e) concerning the control, generally, of the sea-shore and of the sea;
- (f) prescribing fees for the doing of any act upon or in relation to the sea-shore or the sea.

(2) The regulations may provide that any person contravening or failing to comply with any provision thereof shall be guilty of an offence and liable on conviction to such fine, not exceeding two hundred rand, or to imprisonment for such period, not exceeding one year, as may be specified therein, or to both such fine and such imprisonment.

(3) (a) Notwithstanding the provisions of any other law, any regulation may be declared to be applicable to the whole of the sea-shore or to any defined portion thereof or to the whole of the sea or to any defined portion thereof.

(b) The Minister may declare any regulation to be applicable to any State-owned land ad-

joining or situated near the sea-shore and for the purposes of the application of any such regulation, any State-owned land to which such regulation has been so declared to be applicable, shall be deemed to be a portion of the sea-shore.

(c) When any regulation applies to any portion of the sea-shore situated within or adjoining the area of jurisdiction of a local authority or to any portion of the sea adjoining such portion of the sea-shore, the Minister may, by notice in the *Gazette* and in not less than one newspaper circulating in the area of jurisdiction of such local authority, confer powers or impose duties in relation to the administration of such regulation upon such local authority or upon any of its officers.

(d) Not less than thirty days before any regulation is made under this section, the Minister, or where a local authority desires to make a regulation, that a local authority, shall cause a copy of the proposed regulation to be published in the *Gazette* and in not less than one newspaper circulating in the neighbourhood where the regulation will apply.

(e) Before the Minister declares any regulation to be applicable to any portion of the sea-shore situated within or adjoining the area of jurisdiction of a local authority, the Minister shall consult the local authority concerned and submit to it a copy of the regulation.

(4) When a local authority is responsible for the administration of any regulation made under this section, such regulation, or any other regulation made under this section, may provide that all fees and fines recovered under that regulation, shall accrue to that local authority.

(5) Nothing contained in this section or in any regulation made under this section shall affect any by-law lawfully made by a local authority under any law.

(6) A local authority in whom the ownership of any portion of the sea-shore is vested, may, with the approval of the Minister, make regulations for the control of that portion of the sea-shore and the sea adjoining that portion, for any of the purposes mentioned in subsection (1).

(7) Any regulation made under subsection (1) or subsection (6) may differentiate between different classes or kinds of users of the sea-shore or the sea, may prescribe different fees or conditions in respect of different classes or kinds of the said users and may prescribe that any local authority responsible for the administration of any such regulation, may grant any consent under such regulation on such terms or conditions as it may deem fit.

Delegation of powers.

11. The Minister may delegate to any office in the full-time service of the State, the powers conferred upon him by section 3(1) or (2) or 9, but shall not thereby be divested of his powers so delegated, and may modify or withdrawn any decision of such officer.

Savings.

12. Nothing contained in this Act shall affect -

- (a) any rights or powers conferred upon any department or authority by or under any law relating to ports and harbours in respect of any portion of the sea-shore or the sea and in the event of any conflict between the provisions of this Act and any such law, the rights and powers of such department or authority shall be determined by the provisions of such law, and not by the provisions of this Act;

(b) any rights of any member of the public to use the sea-shore or the sea, except in so far as such rights are inconsistent with the rights conferred by any title validated by this Act, or by any title, lease, permit, authority, delegation or regulation lawfully issued, entered into, granted or made by virtue of this Act or by virtue of any such title, lease, permit, authority, delegation or regulation;

(c) any rights or powers conferred upon any person by any licence granted by the Postmaster-General in terms of section 78 of the Post Office Act, 1958 (Act 44 of 1958).

Repeal
of laws.

13. The Sea-shore Act, 1935 (Act 21 of 1935), the Sea-shore Amendment Act, 1959 (Act 60 of 1959), the Sea-shore Amendment Act, 1963), the Sea-shore Amendment Act, 1969 (Act 45 of 1969) and the Sea-shore Amendment Act, 1972 (Act 38 of 1972) are hereby repealed.

Short Title.

14. This Act shall be known as the Sea-shore Act, 1979.

UMTHETHO OWENZA IMIBANDELA WOKUSEBENZISA GWENXA AMACHIZA A—
KHOBOKISAYO NAMAZIKO OHLAZIYO—ZIMILO, 1979.

UMTHETHO

(Obhalwe ngesiNgesi nangesiXhosa usayinwe yiPrezidanti(Uvunyiwe ngomhla we 23 Julayi 1979)

Wokufakela imibandela kwimigaqo yoMthetho wokuSebenzisa Gwenxa amaChiza Akhobokisayo namaZiko oHlaziyo-zimilo, 1971 ebhekiselele kwizigwebo eziya kuwiswa ngokuphathelele kugwetyo lwezaphulo-mthetho ezithile.

KUQINGQWA UMTHETHO yiPrezidanti nesiWisimthetho seLizwe seRiphabliki yeTranskei, ngolu hlobo:-

Ubeko-siqendu endaweni yesiqendu 2 soMthetho 41 wowe 1971.

“Kwalelwe ukuthengisa, ukusebenzisa okanye ukuba nazo kuwe iziyobisi ezikhobokisayo ezingavunyelweyo okanye eziyingozi.

1. Esi siqendu singezants'apha ngokwenjenje sibekwa endaweni yesiqendu 2 soMthetho wokuSebenzisa Gwenxa amaChiza Akhobokisayo namaZiko oHlaziyo-zimilo, 1971 (ngezants'apha oya kwaziwa ngokuba nguMthetho oyintloko):

2. Nangani kukho nakuphi na okuchasene noku kuwo nawuphi na umthetho, nawuphi na umntu -

(a) othengisa ngaso nasiphi na isiyobisi esikhobokisayo esalelweyo okanye nasiphi na isihluma ekungenziwa ngaso eso siyobisi sikhobokisayo; okanye

(b) onaso kuye okanye osebenzisa nasiphi na isiyobisi okanye isihluma esinjalo esikhobokisayo; okanye

(c) othengisa ngaso nasiphi na isiyobisi esiyingozi esikhobokisayo okanye nasiphi na isihluma ekungenziwa ngaso isiyobisi esinjalo; okanye

(d) onaso kuye okanye osebenzisa nasiphi na isiyobisi okanye isihluma ekubhekiswe kuso emhlathini (c),

uya kuba netyala lokwaphul'umthetho aze ekugwetyweni amelwe kukuba -

(i) alantshwe etrongweni isithuba esingengaphantsi kweminyaka emihlanu, koko singagqithi kwiminyaka elishumi elinesihlanu, xa ikukugwetywa okokuqala ngokukreqa nawuphi na umgaqo womhlathi (a) okanye (c);

(ii) alantshwe etrongweni isithuba esingengaphantsi kweminyaka elishumi, koko singagqithi kwiminyaka engamashumi amabini anesihlanu, xa ikukugwetywa okwesibini okanye okulandela oko ngokukreqa nawuphi na umgaqo ekubhekiswe kuwo emhlathini (i);

(iii) alantshwe etrongweni isithuba esingengaphantsi kweminyaka emibini, koko singagqithi kwiminyaka elishumi, xa ikukugwetywa okokuqala ngokukreqa nawuphi na umgaqo ekubhekiswe kuwo emhlathini (c) okanye (d);

No. 1912

12 October 1973

I, Stefanus Louwrens Muller, Minister of Economic Affairs, do hereby make the following regulations in terms of sections 3, 7, 8, 9, 10, 11, 13 and 16 of the Sea Fisheries Act, 1973 (Act 58 of 1973):

REGULATIONS SEA FISHERIES ACT, 1973

PART I

A. Definitions

1. In these regulations, unless the context otherwise indicates, any expression to which a meaning has been assigned in the Sea Fisheries Act, 1973, bears the meaning assigned thereto, and—

(i) "alikeukel" means any species of alikeukel, including paraclough (*Turbo sarmaticus*) also known as giant periwinkle or olly crock; (i)

(ii) "armadillo" means any species of armadillo (*Dinoplox gigas*), also known as baby's cradle; (ii)

(iii) "baleen whale" means any whale which has baleen or whale bone in the mouth, that is, any whale other than a toothed whale; (iii)

(iv) "beach trek-seine net" means any net, with or without a cod-end which is used from the shore, cast around the fish, and then hauled simultaneously by both ends onto the shore till the catch is landed; (xlv)

(v) "black mussel" means any species of black mussel (*Aulacomya crenatus*, *Aulacomya magellanica*, *Choromytilus meridionalis* and *Perna perna*); (xlvii)

(vi) "bloodworm" means any species of bloodworm (*Arenicola* spp.); (v)

(vii) "blue whale" means any whale known by the name of blue whale, Sibbald's rorqual or "sulphur bottom" (*Balaenoptera* or *Sibbaldus musculus*); (vi)

(viii) "bryde's whale" means any whale known as bryde's whale (*Balaenoptera edeni* or *brydei*); (vii)

(ix) "clam" means any clam (*Macra glabrata*); (xiii)

(x) "coast line" means the line which is formed by the high-water mark; (xxv)

(xi) "complete treatment" means treatment whereby all parts of the whale are utilised; (liii)

(xii) "crab" means any crab (*Scylla serrata*); (xxi)

(xiii) "dauhval" means any unclaimed dead whale found floating; (ix)

(xiv) "diving" means the practice of diving below the surface of the water, with or without the use of equipment of any type designed or used for the purpose of facilitating swimming or diving under water; (xii)

(xv) "driftnet" means any net which is not anchored but left in a drifting position in the water with the purpose of ensnaring fish therein; (xi)

(xvi) "East Coast rock lobster" means any East Coast rock lobster (*Parulirus homarus*); (xxx)

(xvii) "East Coast rock lobster tail" means the tail of an East Coast rock lobster; (xxxi)

(xviii) "fin whale" means any whale known as common finback, common rorqual, finback, finner, fin whale, herring whale, razorback or true fin whale (*Balaenoptera physalus*); (lii)

(xix) "gray whale" means any whale known as gray whale, California gray, devil fish, hard head, mussel digger, gray back or rip sack (*Rhachianectes glaucus*); (li)

(xx) "harbour master" means the officer appointed by the Minister to supervise and control the use of any fishing harbour and generally to carry out the provisions of Part X of these regulations and includes any sea fisheries inspector or any other appointed officer authorised to act temporarily in the capacity as harbour master; (xvi)

No. 1912

12 Oktober 1973

Ek, Stefanus Louwrens Muller, Minister van Ekonomiese Sake, vaardig hierby ingevolge artikels 3, 7, 8, 9, 10, 11, 13 en 16 van die Wet op Seevisserye, 1973 (Wet 58 van 1973), die volgende regulasies uit:

REGULASIES WET OP SEEVISSERYE, 1973

DEEL I

A. Woordomskriving

1. In hierdie regulasies, tensy uit die samehang anders blyk, het enige uitdrukking waaraan daar in die Wet op Seevisserye, 1973, 'n betekenis geheg is, die betekenis wat aldus daaraan geheg is, en beteken—

(i) "alikeukel" enige soort alikeukel, met ingegrip van "paraclough" (*Turbo sarmaticus*) ook bekend as "giant periwinkle" of "olly crock"; (i)

(ii) "armadillo" enige soort armadillo (*Dinoplox gigas*), ook bekend as "baby's cradle"; (ii)

(iii) "baleinwalvis" enige walvis wat balein of walvisbeen in die bek het, d.w.s. enige ander walvis as 'n tandwalvis; (iii)

(iv) "beursseën" of "beursnet" enige omsingelingsnet van enige grootte wat aan die oppervlak van die water deur vlotte langs die hooflyn gestut en deur gewigte langs die voettou beswaar word, en wat voorsien is van 'n beurslyn, geskakel by 'n tussenpunt of tussenpunte of 'n knoop, wat deur ringe loop wat vasgemaak is aan die voettou deur middel waarvan die onderent van die net bymekeer getrek word, en sluit enige net in wat by wyse van 'n beurswerking bymekeer getrek word; (xxv)

(v) "bloedwurm" enige soort bloedwurm (*Arenicola* spp.); (vi)

(vi) "blouwalvis" enige walvis bekend as blouwalvis, Sibbald se vinvis of "sulphur bottom" (*Balaenoptera* of *Sibbaldus musculus*); (vii)

(vii) "brydeswalvis" enige walvis bekend as Brydeswalvis (*Balaenoptera edeni* of *brydei*); (viii)

(viii) "bulrugwalvis" enige walvis bekend as bulrugwalvis (*Megaptera nodosa* of *novaeangliae*); (xxi)

(ix) "dauhval" enige onopgeëiste dooie walvis wat drywend gevind word; (xiii)

(x) "die Wet" die Wet op Seevisserye, 1973 (Wet 58 van 1973); (1)

(xi) "dryfnet" enige net wat nie geanker word nie maar wat in 'n drywende posisie in die water gelaat word met die doel om vis daarin te verstriek; (xv)

(xii) "duik" die praktyk om onder die oppervlakte van die water te duik, met of sonder die gebruik van toerusting van enige aard wat ontwerp is of wat aangewend word met die doel om swem of duik onder die water te vergemaklik; (xiv)

(xiii) "gapermossel" enige gapermossel (*Macra glabrata*); (ix)

(xiv) "garnaal" enige soort garnaal, met inbegrip van moddergarnaal (*Callinassa* spp. en *Upogebia africana*); (xxiv)

(xv) "Groenlandse walvis" enige walvis bekend as Atlantiese walvis, Noordpoolse walvis, Biskajewalvis, "bowhead", grootyswalvis, Noordkapper, Noord-Atlantiese walvis, Noord-Kaapse walvis, Stille Oseaan-walvis, Dergwalvis, Suidelike Dergwalvis of Suidelike walvis (*Balaena mysticetus*, *Eubalaena glacialis*, *E. australis*, *Neobalaena marginata*); (xxviii)

(xvi) "hawemeester" 'n beampete wat deur die Minister aangestel is om oor 'n vissershawe toesig te hou en die gebruik daarvan te beheer en om die bepalinge van Deel X van hierdie regulasies in die algemeen uit te voer, en sluit ook enige seevisserye-inspekteur of enige ander aangestelde beampete wat tydelik in die hoedanigheid van hawemeester optree, in; (xx)

(xxi) "humpback whale" means any whale known by the name of hunch, humpback, humpback whale, hump-backed whale, hump whale or hunchbacked whale (*Megaptera nodosa* or *novaeangliae*); (viii)

(xxii) "in the Republic, excluding the territory" means in the Republic of South Africa and in the sea opposite the coast line of the Republic of South Africa; (xviii)

(xxiii) "in the territory" means in the territory of South-West Africa and in the sea opposite the coast line of the territory of South-West Africa; (xvii)

(xxiv) "land station" means any factory on land, or in the territorial waters adjacent thereto, in which or at which whales are treated whether wholly or in part, and shall include a vessel, the movements or anchorage of which is confined to the fishing zone of the Republic; (xxvi)

(xxv) "limpet" means any species of limpet (*Patella* spp.); (xx)

(xxvi) "midwater-trawl-net" means any net operated in such a manner as to drag along any given depth between the bottom and the surface of the sea; (xxvii)

(xxvii) "minke whale" means any whale known by the name of lesser rorqual, little piked whale, minke whale, pikeheaded whale or sharp headed finner (*Balaenoptera acutorostrata*, *Balaenoptera davidsoni*, *Balaenoptera huttoni*); (xxviii)

(xxviii) "octopus" means any octopus (*Octopus* spp.), also known as seacat; (xxxix)

(xxix) "oyster" means any species of oyster including *Crassostrea margaritacea*, *Ostrea atherstonei* and *Pinctada capensis*; (xxix)

(xxx) "pelagic fish" means any fish of the species anchovy (*Engraulis capensis*), pilchard (*Sardinops ocellata*), maasbanker (*Trachurus trachurus*), mackerel (*Scomber japonicus*), round herring ("rooi-oog") (*Etrumeus* spp.) and latern fish (*Myctophidae* spp.); (xxxii)

(xxxi) "periwinkle" means any species of periwinkle including *Oxystele variegata* and *Turbo crenatus*; (xxxiii)

(xxxii) "perlemoen" means any species of perlemoen other than "siffie" or Venus Ear and includes abalone (*Haliotis midae*); (xxxiv)

(xxxiii) "polychaete worm" means any marine worm (*Polychaeta* spp.) including coral, wonder, shingle, moonlight, "pot", rock- or flat-worm; (xxxv)

(xxxiv) "prawn" means any species of prawn, including mud prawn (*Callinassa* spp. and *Upogebia africana*); (xiv)

(xxxv) "purse-seine net" means any encircling net of any size which is supported at the surface of the water by floats along the head-line and weighted by weights along the footrope, and which is provided with a purse-line, shackled either at an intermediate point or points or knot, which runs through rings attached to the footrope by means of which the bottom of the net is drawn together; and shall include any net which is drawn together by means of a purse action; (iv)

(xxxvi) "razor clam" means any razor clam (*Solen* spp.), also known as pen-knife or pencil bait; (xlv)

(xxxvii) "red bait" means any red bait (*Pyura stolonifera*); (xxxvii)

(xxxviii) "right whale" means any whale known by the name of Atlantic right whale, Arctic right whale, Biscayan right whale, bowhead, great polar whale, Greenland right whale, Greenland whale, Nordkaper, North Atlantic right whale, North Cape whale, Pacific right whale, pigmy right whale, Southern pigmy right whale or Southern right whale (*Balaena mysticetus*; *Eubalaena glacialis*, *E. australis*, *Neobalaena marginata*); (xv)

(xxxix) "rock lobster" means the Cape rock or spiny lobster or "kreef" (*Jasus lalandii*); (xxii)

(xvii) "in die gebied" in die gebied Suidwes-Afrika en in die see teenoor die kuslyn van die gebied Suidwes-Afrika; (xxiii)

(xviii) "in die Republiek, uitgesonderd die gebied" in die Republiek van Suid-Afrika en in die see teenoor die kuslyn van die Republiek van Suid-Afrika; (xxii)

(xix) "kammossel" enige kammossel (*Pecten sulcicostatus*); (xlix)

(xx) "klipmossel" enige soort klipmossel (*Patella* spp.); (xxv)

(xxi) "krap" enige krap (*Scylla serrata*); (xii)

(xxii) "kreef" die Kaapse rots- of stekelrige seekreef of kreef (*Jasus lalandii*); (xxxix)

(xxiii) "kreeffuik" enige fuik, pot of ander werktuig van watter konstruksie ook al, wat bedoel is of gebruik word vir die vang of hou van kreef, maar uitgesonderd 'n kreefringnet; (xli)

(xxiv) "kreefstert" enige kreefstert afkomstig van die Kaapse rots- of stekelrige seekreef of kreef; (xl)

(xxv) "kuslyn" die lyn wat deur die hoogwatermerk gevorm word; (x)

(xxvi) "landstasie" enige fabriek op land of in die aangrensende territoriale waters waar of waarin walvisse geheel en al of gedeeltelik verwerk word en sluit 'n vaartuig in waarvan die bewegings of ankerplek tot die visserij van die Republiek beperk word; (xxiv)

(xxvii) "midwatertreilnet" enige net wat op so 'n wyse gebruik word dat dit op enige gegewe diepte tussen die bodem en die oppervlak van die see sleep; (xxvi)

(xxviii) "minkewalvis" enige walvis bekend onder die naam die kleiner vinvis, klein snawelvinvis, minkewalvis, dwergvinvis of somervinvis (*Balaenoptera acutorostrata*, *Balaenoptera davidsoni*, *Balaenoptera huttoni*); (xxvii)

(xxix) "oester" enige soort oester insluitende *Crassostrea margaritacea*, *Ostrea atherstonei* en *Pinctada capensis*; (xxix)

(xxx) "Ooskuskreef" enige ooskuskreef (*Panulirus homarus*); (xvi)

(xxxi) "Ooskuskreefstert" die stert van 'n ooskuskreef; (xvii)

(xxxii) "pelagiese vis" enige vis van die soort ansjovis (*Engraulis capensis*), sardyn (pelser) (*Sardinops ocellata*), maasbanker (*Trachurus trachurus*), makriel (*Scomber japonicus*), rooi-oog (round herring) (*Etrumeus* spp.) en laternvis (*Myctophidae* spp.); (xxx)

(xxxiii) "periwinkle" enige soort periwinkle insluitende *Oxystele variegata* en *Turbo crenatus*; (xxxii)

(xxxiv) "perlemoen" enige soort perlemoen anders as siffie of "Venus Ear" en sluit "abalone" (*Haliotis midae*) in; (xxxii)

(xxxv) "polychaete-wurm" enige seewurm (*Polychaeta* spp.), met inbegrip van koraal, wonder, "shingle" maasbanker, potklip- of platwurm; (xxxiii)

(xxxvi) "potvis" enige walvis bekend as potvis, spermacetiwalvis of masvis (*Physeter catodon*); (xlvii)

(xxxvii) "rooi-aas" enige rooi-aas (*Pyura stolonifera*); (xxvii)

(xxxviii) "sandmossel" enige soort sandmossel (*Mactra glabrata*); (xlv)

(xxxix) "seekat" enige seekat (*Octopus* spp.); (xxviii)

(xl) "seekomkommer" enige soort seekomkommer van die klas "*Echinoidea*"; (xliii)

(xli) "seekrap" enige seekrap insluitende die soort *Lupa pelagica* en *Plagusia chabrui*; (xlii)

(xlii) "seiwalvis" enige walvis bekend as seiwalvis, Rudolphi se Vinvis, pollakwalvis of koolvinwalvis (*Balaenoptera borealis*); (xlv)

(xliii) "siffie" enige ander soort siffie as perlemoen of "abalone" en sluit "Venus Ear" (*Haliotis sanguinea*) in; (xlv)

(xl) "rock lobster tail" means any rock lobster tail derived from the Cape rock or spiny lobster or "kreef"; (xxiv)

(xli) "rock lobster trap" means any trap, pot or other implement of whatever construction, intended or used for the catching or holding of rock lobster, but excluding a rock lobster ringnet; (xxiii)

(xlii) "sea crab" means any sea crab including the species *Lupa pelagica* and *Plagusia chabrus*; (xli)

(xliii) "sea urchins" means any species sea urchin of the class *Echinoidea*; (xl)

(xliv) "sei whale" means any whale known by the name of sei whale, Rudolphi's rorqual, pollack whale or coalfish whale (*Balaenoptera borealis*); (xlii)

(xlv) "sand mussel" means any species of sand mussel (*Macra glabrata*); (xxxviii)

(xlvi) "siffie" means any siffie, other than perlemoen or abalone, and includes Venus Ear (*Haliotis sanguinea*); (xliii)

(xlvii) "sperm whale" means any whale known as sperm whale, spermacet whale, cachalot or pot whale (*Physeter catodon*); (xxxvi)

(xlviii) "staked or set net" means any net which is anchored by means of weights at the bottom of the sea and operated in such a manner as to obstruct the free passage of fish from one area to another. (A "staked" or "set" net shall be considered set or staked when any of the weights attached to the net rest on the bottom of the sea or if such net or a portion thereof is tied to any object on or under the water); (xlv)

(xlix) "scallop" means any scallop (*Pecten sulcicostata*); (xix)

(l) "the Act" means the Sea Fisheries Act, 1973 (Act 58 of 1973); (x)

(li) "trawl net" means any net operated in such a manner as to drag along the bottom or floor of the sea, and shall include any "otter" or "beam" trawl net; (xlviii)

(lii) "trawl fish" means any species of fish caught by means of a trawl net; (xlix)

(liii) "trek netting area" means any area in which beach trek-seine nets are used; (l)

(liv) "whale catcher" means any ship used for the purpose of killing whales, but shall not include any ship used solely for the purpose of towing, holding onto or scouting for whales; (lvi)

(lv) "whales taken" means whales that have been killed and either flagged or attached to whale catchers; (lv)

(lvi) "whaling inspector" means any officer appointed by the Minister for the purposes of enforcing the regulations; (liv) and

(lvii) "white mussel" means any species of mussel (*Donax serra*); (lvii).

B. Application

2. Except as otherwise expressly provided, these regulations shall also be applicable to any boat or any factory licensed or required to be licensed in terms of the Act, or in respect of any person on such boat also beyond the fishing zone of the Republic as defined in section 3 of the Territorial Waters Act, 1963 (Act 87 of 1963).

PART II

Registration and Licensing of Fishing Boats and Fishing Factories

3. For the purposes of these regulations—

(1) the director is the licensing officer for fishing boats registered in respect of a harbour in the Republic, excluding the territory, and of fishing factories; and

(xliv) "skeermesgapermossel" enige skeermesgapermossel (*Solen* spp.) ook bekend as "pen knife" of "pencil"-aas; (xxxvi)

(xlv) "span-" of "stelnet" enige net wat deur middel van gewigte op die bodem van die see geanker word en op so 'n wyse gebruik word dat dit die vrye deurtog van vis van een gebied na 'n ander versper ('n "span-" of "stelnet" word as gespan of gestel beskou indien enige van die gewigte aan die net op die seebodem rus of indien sodanige net of slegs 'n gedeelte daarvan aan enige voorwerp op of onder die water verbind is); (xlviii)

(xlvii) "strandtrekseën" enige net, met of sonder 'n sak-end of "kuil", wat vanaf die strand gebruik word, om vis gewerp word en dan gelyktydig aan albei ente tot op die strand getrek word totdat die vangs aan wal gebring is; (iv)

(xlviii) "swartmossel" enige soort swartmossel (*Aulacomya crenatus*, *Aulacomya megellanica*, *Choromytilus meridionalis*, en *Perna perna*); (v)

(xlviii) "treilnet" enige net wat op so 'n wyse gebruik word dat dit oor die seebodem of -bedding sleep en sluit enige "otter"—of "balk"—treilnet in; (li)

(xlix) "treilvis" enige soort vis wat deur middel van 'n treilnet gevang word; (lii)

(l) "trekgebied" enige gebied waar strandtrekseëns gebruik word; (liii)

(li) "vaalwalvis" enige walvis bekend as vaalwalvis, "California Grey", "devil fish", "hard head", "mussel digger", "grey back" of "rip sack" (*Rhachianectes glaucus*); (xix)

(lii) "vinwalvis" enige walvis bekend as gewone vinrugwalvis, gewone walvis, vinrugwalvis, haringwalvis, spitsrugwalvis of ware vinwalvis (*Balaenoptera physalus*); (xviii)

(liii) "volledige verwerking" verwerking waarby alle dele van 'n walvis gebruik word; (xi)

(liv) "walvisinspekteur" enige beamppte wat deur die Minister aangestel is vir die toepassing van die regulasies; (lvi)

(lv) "walvisse gevang" walvisse wat doodgemaak en of met 'n vlag gemerk of aan 'n walvisvanger vasgemaak is; (lv)

(lvi) "walvisvanger" enige skip wat gebruik word met die doel om walvisse dood te maak, maar sluit nie 'n skip in wat uitsluitlik gebruik word vir die doel om walvisse te sleep, aan hulle vas te hou of na hulle te soek nie;

(liv) en (lvii) "witmossel" enige soort mossel (*Donax serra*); (lvii)

B. Toepassing

2. Uitgesonderd waar uitdruklik anders bepaal word, is hierdie regulasies ook ten opsigte van enige boot of enige fabriek wat ingevolge die Wet gelisensieer is of moet wees, of ten opsigte van enige persoon daarop ook buite die visseriesone van die Republiek soos omskryf in artikel 3 van die Wet op Territoriale Waters, 1963 (Wet 87 van 1963), van toepassing.

DEEL II

Registrasie en Lisensiering van Vissersbote en Visfabrieke

3. Vir die doeleindes van hierdie regulasies is—

(1) die direkteur die lisensiebeamppte vir vissersbote wat ten opsigte van 'n hawe in die Republiek, uitgesonderd die gebied, geregistreer is en van visfabrieke; en

be painted in white on a black background on both bows in characters not less than 30 cm in height, 20 cm in breadth (figure "1" excepted) and 5 cm in thickness (width of stroke). The space between adjacent letters and figures shall be between 7 cm and 10 cm];

(b) any fishing boat unless it bears the registration letters and number assigned thereto by the director. [Such letters and number shall be painted in black on a white background or in white on a black background on both bows in characters not less than 15 cm in height, 10 cm in breadth (figure "1" excepted) and 2 cm in thickness (width of stroke). The space between adjacent letters and figures shall be between 2 cm and 5 cm]; and

(c) any boat for the catching of rock lobster unless it bears the letter "K" as well as the registration letters and number allocated thereto by the director.

(2) Any registration letters and number and other letters assigned to, and carried by, a boat shall be maintained in a clear, distinct and legible condition and shall at all times be clearly exposed.

17. When any fishing boat ceases to be licensed in terms of the provisions of these regulations, the owner of such fishing boat shall obliterate or remove any registration letters and number from such boat within 21 days of such withdrawal.

18. (1) Any appeal against a decision of the director in terms of section 7 or 8 of the Act shall be directed to the Minister in writing within 60 days of the day the person who feels aggrieved over the decision, was informed of it.

(2) The appeal shall be directed to the Minister per registered post or shall be handed in at his office personally.

(3) The appeal shall give an explanation of all facts relating to the matter as well as the motivation on the basis of which the person who makes the appeal, feels that the decision should be set aside and it should be accompanied by all available documents, or certified copies thereof, relating to the matter.

PART III

CLOSED SEASONS

19. (1) No person shall catch, attempt to catch or disturb any of the following species of fish during the period specified for each of them, and within the specified area, where applicable:

(a) Rock lobster, in the Republic, excluding the territory—1 July up to and including 31 October in any year;

(b) rock lobster, in the territory—1 July up to and including 31 December in any year;

(c) East Coast rock lobster, in the Republic—1 November up to and including 31 January in the following year;

(d) pelagic fish, in the Republic, excluding the territory—1 September up to and including 31 December in any year;

(e) pelagic fish, in the territory—1 September up to and including the last day of February in the following year;

(f) snoek, in the Republic, excluding the territory—1 August up to and including 30 November in any year;

(g) snoek, in the territory—1 July up to and including 31 October in any year;

(h) oysters, oyster spat or spawn, in the Republic—1 December up to and including the last day of February in the following year;

(i) sperm whales—1 November up to and including the last day of February in the following year;

[Genoemde letters en nommer moet minstens 30 cm hoog, 20 cm breed (uitgesonderd syfer "1") en 5 cm dik (breedte van streep) wees en moet in wit verf op 'n swart agtergrond op albei boeë aangebring word. Die ruimte tussen aanliggende letters en syfers moet tussen 7 cm en 10 cm wees];

(b) enige vissersboot gebruik nie, tensy die registrasieletters en -nommer wat die direkteur daaraan toegeken het daarop aangebring is. [Genoemde letters en nommer moet minstens 15 cm hoog, 10 cm breed (uitgesonderd syfer "1") en 2 cm dik (breedte van streep) wees, en in wit verf op 'n swart agtergrond of in swart verf op 'n wit agtergrond op albei boeë aangebring word. Die ruimte tussen aanliggende letters en syfers moet tussen 2 cm en 5 cm wees]; en

(c) enige boot vir kreefvangst gebruik nie, tensy sowel die letter "K" as die registrasieletters en -nommer wat die direkteur daaraan toegeken het, daarop aangebring is.

(2) Enige registrasieletters en -nommer en ander letters wat aan 'n boot toegeken en daarop aangebring is, moet in 'n helder, duidelike en leesbare toestand gehou word en moet te alle tye duidelik blootgestel wees.

17. Wanneer 'n vissersboot ophou om ingevolge die bepalings van hierdie regulasies gelsensieer te wees, moet die eienaar van sodanige vissersboot binne 21 dae na sodanige onttrekking aan gebruik enige registrasieletters en -nommer van sodanige boot uitwis of verwyder.

18. (1) Enige appèl teen 'n besluit van die direkteur ingevolge artikel 7 of 8 van die Wet moet skriftelik aan die Minister gerig word binne 60 dae na die dag waarop die persoon wat hom oordien besluit veronreg voel, daarvan in kennis gestel is.

(2) Die appèl moet per geregistreerde pos aan die Minister gestuur word of persoonlik by sy kantoor ingedien word.

(3) Die appèl moet 'n uiteensetting gee van al die feite by die aangeleentheid betrokke asook die motivering op grond waarvan die persoon wat appèl aanteken van mening is dat die besluit tersyde gestel moet word en moet vergesel wees van alle beskikbare dokumente, of gewaarmerkte afskrifte daarvan, wat op die aangeleentheid betrekking het.

DEEL III

GESLOTE SEISOENE

19. (1) Niemand mag enigeen van die volgende soorte vir gedurende die tydperk genoem vir elkeen, en in die genoemde gebied, waar van toepassing, vang, probeer vang, of steur nie:

(a) Kreef, in die Republiek, uitgesonderd die gebied—1 Julie tot en met 31 Oktober van enige jaar;

(b) kreef, in die gebied—1 Julie tot en met 31 Desember van enige jaar;

(c) oorskuskreef, in die Republiek—1 November tot en met 31 Januarie van die daaropvolgende jaar;

(d) pelagiese vis, in die Republiek, uitgesonderd die gebied—1 September tot en met 31 Desember van enige jaar;

(e) pelagiese vis, in die gebied—1 September tot en met die laaste dag van Februarie van die daaropvolgende jaar;

(f) snoek, in die Republiek, uitgesonderd die gebied—1 Augustus tot en met 30 November van enige jaar;

(g) snoek, in die gebied—1 Julie tot en met 31 Oktober van enige jaar;

(h) oesters, oesterbroed of -kuit, in die Republiek—1 Desember tot en met die laaste dag van Februarie van die daaropvolgende jaar;

(i) potvisse—1 November tot en met die laaste dag van Februarie van die daaropvolgende jaar;

C. Perlemoen

27. (1) The following factories shall not can or freeze a bigger quantity of perlemoen during one calendar year than the quantity shown opposite his name below:

Owner of factory	Quantity (kg)
Blue Star Abalone Exporters (Pty) Ltd.....	12 020
Irvin & Johnson Ltd.....	9 070
K.D.B. Holdings (Pty) Ltd.....	9 070
Sea Plant Products (Pty) Ltd.....	53 210
Tuna Marine (Pty) Ltd.....	59 420
Walker Bay Cannery (Pty) Ltd.....	38 650

(2) the Secretary or an officer authorised by him, may authorise any of the factories mentioned in subregulation (1) to can or to freeze perlemoen or a stipulated quantity of perlemoen on behalf of any of the other factories.

D. Whales

28. The land station belonging to Union Whaling Company Ltd shall not receive or process more than 1 805 sperm whales (905 females and 900 males) during the period 1 April up to and including 31 October in any year: Provided that as soon as the 900 males have been received, no more sperm whales shall be received.

PART VI

PROTECTION OF ROCK LOBSTER AND EAST COAST ROCK LOBSTER

29. No person shall catch the following:

(a) Any female rock lobster or east coast rock lobster in berry (i.e. carrying eggs) or showing signs of having been stripped of the berry; or

(b) any rock lobster or east coast rock lobster, male or female, which is about to, or has recently, cast its shell and is in a soft condition.

30. (1) No person shall catch the following:

(a) In case of the Republic, excluding the territory, any rock lobster, being in a whole state, of a size less than 8,89 cm measured in a straight line along the middle dorsal line of the carapace, from the centre of the posterior edge of the carapace to the tip of the rostrum or middle anterior spine;

(b) in case of the territory, any rock lobster, being in a whole state, of a size less than 6,985 cm, measured in a straight line along the middle dorsal line of the carapace, from the centre of the posterior edge of the carapace to the tip of the rostrum or middle anterior spine; or

(c) any east coast rock lobster, being in a whole state, of a size less than 5,175 cm measured in a straight line along the middle dorsal line of the carapace, from the centre of the edge which connects the two enlarged anterior spines to the middle of the posterior edge of the carapace.

(2) For the purposes of subregulation (1), "edge" means the hard edge of the carapace (or *cephalothorax*) and does not include the edge or any part of the fringe or *setae* (hairs) which protrude rearwards from the carapace.

31. (1) No person shall sell or expose for sale, purchase, transport, remove, possess or be in possession of the following:

(a) In case of the Republic, excluding the territory, any rock lobster tail which has been severed from the body, if the second segment of such rock lobster tail, counted from the junction of the tail with the body, is less than 2,38 cm in length;

(b) in case of the territory, any rock lobster tail which has been severed from the body, if the second segment of such rock lobster tail, counted from the junction of the tail with the body, is less than 1,5 cm in length;

C. Perlemoen

27. (1) Die volgende fabrieke mag nie 'n groter hoeveelheid perlemoen in die loop van een kalenderjaar inmaak of bevries nie as die hoeveelheid wat hieronder teenoor sy naam getoon word:

Eiernaam van fabriek	Hoeveelheid (kg)
Blue Star Abalone Exporters (Pty) Ltd.....	12 020
Irvin & Johnson Ltd.....	9 070
K.D.B. Holdings (Pty) Ltd.....	9 070
Sea Plant Products (Pty) Ltd.....	53 210
Tuna Marine (Pty) Ltd.....	59 420
Walker Bay Cannery (Pty) Ltd.....	38 650

(2) Die Sekretaris of 'n beaampte deur hom daartoe gemagtig, kan enigeen van die fabrieke genoem in subregulasie (1) magtig om perlemoen of 'n bepaalde hoeveelheid perlemoen namens enigeen van die ander fabrieke in te maak of te bevries.

D. Walvisse

28. Die landstasie wat behoort aan die firma Union Whaling Company Ltd mag nie meer as 1 805 potvisse (905 koeie en 900 bulle) in die tydperk 1 April tot en met 31 Oktober van enige jaar ontvang of verwerk nie: Met dien verstande dat sodra die 900 bulle ontvang is, geen verdere potvisse ontvang mag word nie.

DEEL VI

BESKERMING VAN KREEF EN OOSKUSKREEF

29. Niemand mag die volgende vang nie:

(a) Enige wyfie kreef of -ooskuskreef wat eiers dra of wat tekens toon dat die eiers afgestroop is; of

(b) enige kreef of ooskuskreef, hetsy mannetjie of wyfie, wat op die punt staan om sy dop af te werp of dit onlangs gedoen het en wat in 'n sagte toestand verkeer.

30. (1) Niemand mag die volgende vang nie:

(a) In die geval van die Republiek, uitgesonderd die gebied, enige kreef in 'n heel toestand wat kleiner as 8,89 cm is, gemeet in 'n reguit lyn langs die middelruglyn van die kopborsstuk, vanaf die middel van die agterste kant van die kopborsstuk tot by die voorpunt van die rostrum of middelvoorstekel;

(b) in die geval van die gebied, enige kreef, in 'n heel toestand, wat kleiner as 6,985 cm is, gemeet in 'n reguit lyn langs die middelruglyn van die kopborsstuk, vanaf die middel van die agterste kant van die kopborsstuk tot by die voorpunt van die rostrum of middelvoorstekel; of

(c) enige ooskuskreef, in 'n heel toestand, wat kleiner as 5,175 cm is, gemeet in 'n reguit lyn langs die middelruglyn van die kopborsstuk, vanaf die middelpunt van die kant wat die twee vergrote voorstekels verbind tot by die middel van die agterste kant van die kopborsstuk.

(2) By die toepassing van subregulasie (1) beteken "kant" die harde kant van die kopborsstuk (of pantser of *cephalothorax*) en sluit nie die kant of enige deel van die rand of *setae* (hare) wat van die pantser agtertoe uitsteek, in nie.

31. (1) Niemand mag die volgende verkoop, te koop uitstal, koop, vervoer, verwyder, besit of in besit daarvan wees nie:

(a) In die geval van die Republiek, uitgesonderd die gebied, enige kreefstert wat van die lyf afgesny is, indien die tweede segment van sodanige kreefstert, getel vanaf die aansluiting van die lyf met die stert, minder as 2,38 cm lank is;

(b) in die geval van die gebied, enige kreefstert wat van die lyf afgesny is, indien die tweede segment van sodanige kreefstert, getel vanaf die aansluiting van die lyf met die stert, minder as 1,5 cm lank is;

(c) any east coast rock lobster tail which has been severed from the body, if the second segment of such rock lobster tail, counted from the junction of the tail with the body, is less than 2,032 cm in length; or

(d) the berry (or eggs) of any rock lobster or east coast rock lobster.

(2) For the purposes of subregulation (1) a rock lobster tail and an east coast rock lobster tail shall be measured in a straight line along the middle dorsal line from edge to edge of the said segment.

32. Any person who catches or comes into possession of any rock lobster or east coast rock lobster of a size less than that prescribed in regulation 30 or any rock lobster or east coast rock lobster in berry or any rock lobster or east coast rock lobster (male or female) which is about to, or has recently cast its shell and is in a soft condition, shall without delay return such rock lobster or east coast rock lobster to the sea.

33. No person shall return to the sea rock lobster or east coast rock lobster or any part or any offal of any rock lobster or east coast rock lobster: Provided that the provisions of this regulation shall not prohibit the return to the sea of any rock lobster or east coast rock lobster caught in contravention of these regulations.

34. (1) No person shall catch, attempt to catch or disturb any rock lobster or east coast rock lobster in any manner except for his own use in quantities not exceeding five per day: Provided that this subregulation shall not apply to the user of any fishing boat licensed for the catching of rock lobster or of any registered fishing boat being used for the catching of east coast rock lobster.

(2) No person who has caught rock lobster or east coast rock lobster for his own use, shall sell it or offer it for sale.

35. (1) No person who has caught rock lobster with the aid of a registered fishing boat which has been properly authorised therefor in terms of these regulations, shall retain such rock lobster for his own use and he shall deliver it to nobody else than an authorised rock lobster packer.

(2) All rock lobster being received by a rock lobster packer, shall be weighed by him as whole fish.

(3) Without a permit issued by the director, no person shall transport any rock lobster not packed in accordance with the standard specifications of the South African Bureau of Standards, promulgated and published in Government Notice R. 357 of 10 March 1972, in terms of the Standards Act, 1962 (Act 33 of 1962), or packed in live form in a licensed rock lobster packing factory: Provided that any person who has caught rock lobster for his own use in terms of these regulations may transport a maximum of five (5) rock lobsters which has not been packed as stipulated above.

(4) The permit referred to in subregulation (3), shall be issued subject to the conditions the director may determine.

36. (1) No person shall catch, attempt to catch or disturb any rock lobster or east coast rock lobster by means of diving: Provided that rock lobster or east coast rock lobster may be caught by means of diving from the shore only, and without the use of artificial respiratory apparatus, by any person for his own use in quantities not exceeding five (5) per day.

(2) For the purpose of subregulation (1), a snorkel shall not be regarded as an artificial respiratory apparatus.

(3) The skipper or owner of any fishing boat engaged in the catching of rock lobster or east coast rock lobster shall not carry or allowed to be carried on such boat any diving equipment of whatever description, and any rock lobster or east coast rock lobster or any part

(c) enige ooskuskreefstert wat van die lyf afgesny is, indien die tweede segment van sodanige kreefstert, getel vanaf die aansluiting van die lyf met die stert, minder as 2,032 cm lank is; of

(d) die eiers van enige kreef of ooskuskreef.

(2) By die toepassing van subregulasie (1), word 'n kreefstert en 'n ooskuskreefstert gemeet in 'n reguit lyn langs die middelruglyn van kant tot kant van genoemde segment.

32. Enigeen wat enige kreef of ooskuskreef kleiner as dié in regulasie 30 voorgeskryf, of enige kreef of ooskuskreef wat eiers dra, of enige kreef of ooskuskreef (mannetjie of wyfie) wat op die punt staan om sy dop af te werp, of dit onlangs gedoen het, en wat in 'n sagte toestand verkeer, vang of in besit daarvan kom, moet sodanige kreef of ooskuskreef sonder versuim in die see terugplaas.

33. Niemand mag enige kreef of ooskuskreef of enige deel of enige afval van sodanige kreef of ooskuskreef in die see terugplaas nie: Met dien verstande dat die bepalings van hierdie regulasie nie belet dat enige kreef of ooskuskreef wat in stryd met hierdie regulasies gevang is, in die see teruggeplaas word nie.

34. (1) Niemand mag enige kreef of ooskuskreef by wyse van enige metode vang, probeer vang, of steur nie behalwe vir eie gebruik in getalle van hoogstens vyf (5) per dag: Met dien verstande dat hierdie subregulasie nie op die gebruiker van enige vissersboot wat vir die vang van kreef gelisensieer is, of van enige geregistreerde vissersboot wat vir die vang van ooskuskreef gebruik word, van toepassing is nie.

(2) Niemand wat kreef of ooskuskreef vir eie gebruik gevang het, mag dit verkoop of te koop aanbied nie.

35. (1) Niemand wat met 'n geregistreerde vissersboot wat ingevolge hierdie regulasies behoorlik daartoe gemagtig is, kreef gevang het, mag sodanige kreef vir sy eie gebruik hou nie en hy mag dit aan niemand anders nie as aan 'n gemagtigde kreefverpakker lewer nie.

(2) Alle kreef wat deur 'n kreefverpakker ontvang word, moet heel deur hom geweeg word.

(3) Niemand mag sonder 'n permit deur die direkteur uitgereik enige kreef wat nie ooreenkomstig die bepalings van die standaardspesifikasies van die Suid-Afrikaanse Buro vir Standaarde, afgekondig by Goewermentskennisgewing R. 357 van 10 Maart 1972, kragtens die Wet op Standaarde, 1962 (Wet 33 van 1962), of in 'n gelisensieerde kreeffabriek in lewende vorm verpak is, vervoer nie: Met dien verstande dat iemand wat kreef vir eie gebruik ingevolge hierdie regulasies gevang het, 'n maksimum van vyf (5) krewes mag vervoer wat nie verpak is soos hierbo bepaal is nie.

(4) Die permit waarna in subregulasie (3) verwys word, word uitgereik onderworpe aan die voorwaardes wat die direkteur bepaal.

36. (1) Niemand mag enige kreef of ooskuskreef by wyse van duik vang, probeer vang of steur nie: Met dien verstande dat kreef of ooskuskreef by wyse van duik alleenlik van die strand, sonder die gebruik van kunstnate asemhalingsapparate, gevang mag word deur 'n persoon vir sy eie gebruik in getalle van hoogstens vyf (5) per dag.

(2) By die toepassing van subregulasie (1) word 'n snorkel nie beskou as 'n kunstmatige asemhalingsapparaat nie.

(3) Die skipper of eienaar van 'n vissersboot wat by die vang van kreef of ooskuskreef betrokke is, mag nie op sodanige boot enige duiktoerusting van watter aard ook al dra of toelaat dat dit daarop gedra word nie, en enige

thereof found on any boat carrying diving equipment shall be deemed to having been caught by means of diving otherwise than from the shore, except if the contrary is proved.

37. (1) No person who catches rock lobster for his own use, shall use any rock lobster trap or similar instrument.

(2) The skipper or owner of a fishing boat shall not carry or allow to be carried on such boat any rock lobster net or trap during the period in which the catching of rock lobster is prohibited in terms of these regulations.

(3) No person shall use any fishing boat for the catching of rock lobster with the aid of rock lobster traps in the Republic, excluding the territory, unless such fishing boat is equipped with a deck grid sorter.

(4) The deck grid sorter referred to in subregulation (3) shall comply with the following specifications:

(a) Definitions

In this subregulation—

(i) "frame" means the rectangular metal frame supporting the rods and supporting bar;

(ii) "grid" means the rods and supporting bar excluding the frame; and

(iii) "useful surface area" means that area measured from the inside edges of the frame (but excluding the two end gaps, when the gaps are less than the specified minimum).

(b) Material

The grid and the frame shall be made from stainless steel or galvanised mild steel.

(c) Construction

(i) *General.*—The grid assembly shall be rectangular in shape and shall have a minimum width of 750 mm. The required width (above 750 mm) and length may be as specified by the purchaser/user.

The useful surface area shall not be less than 1,1 m². The gap between adjoining rods, measured at any point, shall not be less than 49,6 mm and not more than 50,4 mm. The width of the two end gaps, i.e. the gaps between the last rod and the frame, shall not exceed 50,4 mm.

(ii) *Frame.*—The frame of the grid assembly shall be of flat bars having a minimum thickness of 8 mm and a width of not less than 40 mm. The two longitudinal bars that form the sides of the frame shall be drilled with a series of 16 mm clearance holes to accommodate the rods of the grid.

The two transverse bars shall be welded to the ends of the longitudinal bars as to form a rectangular frame. The pitch of the holes shall be such that the gaps between the rods, when in position are within the specified limits.

(iii) *Grid.*—The grid shall consist of the appropriate numbers of rods of a nominal diameter of 16 mm and a supporting bar, of a minimum thickness of 6 mm and a width of not less than 40 mm. The supporting bar shall be centrally positioned between and parallel to the longitudinal bars of the frame and shall be drilled with a series of clearance holes matching those in the longitudinal bars. The ends of the supporting bar shall be welded to the frame and the ends of the rods shall be so tackwelded to the frame that the welds do not protrude above the outer surface of the frame.

(iv) *Welds.*—Welds, in the case of stainless steel, shall be fusion welds done by the inert gas arc welding process or, in the case of stainless or mild steel, by any other welding process that produces a weld whose mechanical properties and corrosion resistance are at least of the same order as those of the parent metal.

kreef of oorskuskreef of enige gedeelte daarvan wat op enige boot wat sodanige duiktoerusting dra, gevind word, word geag by wyse van duik gevang te gewees het andersins as van die strand, tensy die teendeel bewys word.

37. (1) Niemand wat vir eie gebruik kreef vang, mag enige kreeffuik of soortgelyke instrument gebruik nie.

(2) Die skipper of eienaar van 'n vissersboot mag nie op sodanige boot enige kreefnets of -fuik dra of toelaat dat dit daarop gedra word gedurende die tydperk waarin die vang van kreef kragtens hierdie regulasies verbied is nie.

(3) Niemand mag 'n vissersboot vir die vang van kreef met behulp van kreeffuik in die Republiek, uitgesonderd die gebied, gebruik nie tensy sodanige vissersboot met 'n dekkroostersorteerder toegerus is.

(4) Die dekkroostersorteerder waarna in subregulasie (3) verwys word, moet aan die volgende spesifikasies voldoen:

(a) Woordskrywing

In hierdie subregulasie beteken—

(i) "raam" die reghoekige metaalraam wat die stange en die steunstaaf steun;

(ii) "rooster" die stange en steunstaaf sonder die raam; en

(iii) "bruikbare oppervlakte" die oppervlakte gemeet van die binnekant van die raam af (maar uitgesonderd die gapings aan die twee ente, indien hierdie gapings minder is as die gespesifiseerde minimum).

(b) Materiaal

Die rooster en die raam moet van vlekvrystaal of gegalaniseerde sagtestaal vervaardig wees.

(c) Konstruksie

(i) *Algemeen.*—Die roostersamestel moet reghoekig wees en moet 'n minimum wydte van 750 mm hê. Die koper/gebruiker kan die wydte (bo 750 mm) en die lengte spesifiseer. Die bruikbare oppervlakte mag nie minder as 1,1 m² wees nie.

Die gaping tussen aanliggende stange, by enige punt gemeet, moet nie minder nie as 49,6 mm en nie meer nie as 50,4 mm wees. Die wydte van die gapings by die twee ente, dit wil sê die gapings tussen die laaste stang en die raam, mag nie meer as 50,4 mm wees nie.

(ii) *Raam.*—Die raam van die roostersamestel moet gemaak wees van platstawe met 'n minimum dikte van 8 mm en 'n minimum breedte van 40 mm. In die twee langstawe wat die kante van die raam vorm, moet 16 mm-vry pasgate geboor wees waardeur die stange van die rooster pas.

Die twee dwarsstawe moet op so 'n wyse aan die ente van die twee langstawe vasgesweis wees dat hulle 'n reghoekige raam vorm. Die spasiering van die gate moet sodanig wees dat die gapings tussen die stange, wanneer hulle in posisie is, binne die gespesifiseerde perke is.

(iii) *Rooster.*—Die rooster moet bestaan uit die toepaslike aantal stange met 'n nominale deursnee van 16 mm en 'n steunstaaf met 'n minimum dikte van 6 mm en 'n breedte van nie minder nie as 40 mm. Die steunstaaf moet sentraal geplaas wees tussen en ewewydig aan die langstawe van die raam en daar moet 'n reeks vrypasgate daarin geboor wees wat ooreenstem met dié in die langstawe. Die ente van die steunstaaf moet aan die raam vasgesweis wees en die ente van die stange moet op so 'n wyse aan die raam geheg wees dat die swislasie nie op die buiteoppervlak van die raam uitstaan nie.

(iv) *Sweislasie.*—Sweislasie moet in die geval van vlekvrystaal smeltswislasie wees wat volgens die traegasboogswislasieproses gemaak is of, in die geval van vlek-vry of sagtestaal, volgens enige ander sweisproses wat 'n sweislas lewer waarvan die meganiese eienskappe en korrosiebestandheid minstens gelykstaande is met dié van die moedermetaal.

(v) *Finish*.—All exposed surfaces shall be smooth and free of sharp edges or any other injurious defects.

(5) All rock lobster taken on board of any fishing boat which operates with rock lobster traps in the Republic, excluding the territory, shall be sorted by means of the deck grid sorter: Provided that any person who catches or comes in possession of any rock lobster in contravention of the provisions of these regulations shall without delay return such rock lobster to the sea.

38. All rock lobster or east coast rock lobster not caught in contravention of these regulations shall be retained in a whole state until landed or brought ashore: Provided that rock lobster tails or east coast rock lobster tails may be carried on board of any boat if such tails are packed in accordance with the provisions of the standard specifications of the South African Bureau of Standards, promulgated and published in Government Notice R. 357 of 10 March 1972, in terms of the Standards Act, 1962 (Act 33 of 1962).

39. (1) No person shall land any rock lobster or any part of such rock lobster at any time or at any place along the coast in the area bounded by a line (270° true) from the most southerly point at Cape Agulhas and a line (270° true) opposite the northern bank of the mouth of the Kunene River, other than at the following landing points:

(a) *Division of Lüderitz*.—The jetties of Messrs Angra Pequena Viskorporasie Beperk, Sea Products (SWA) Limited and South West African Fishing Industries Limited, at Luderitz.

(b) *Division of Namaqualand*.—(i) The jetties of Messrs John Ovenstone Ltd and Hicksons Canning Company (S.A.) Ltd, including the sea-shore between these two jetties at Port Nolloth;

(ii) the area between two white concrete beacons marked A1, indicating the northern boundary, and A2, indicating the southern boundary, and situated on the sea-shore known as Still Bay, adjoining the rock lobster factory of Messrs Port Nolloth Visserie Bpk. at Port Nolloth; and

(iii) the jetty of Messrs Namaqua Canning Company Ltd at Hondeklip Bay.

(c) *Division of Vanrhynsdorp*.—(i) The sea-shore and jetty between two white concrete beacons marked B1, indicating the northern boundary, and B2, indicating the southern boundary, and situated near the rock lobster factory of Messrs North Bay Canning Company Ltd at Doringbaai; and

(ii) the sea-shore and jetty between two white concrete beacons marked C1, indicating the northern boundary, and C2, indicating the southern boundary, and situated on the shore near the jetty at Donkin's Bay.

(d) *Division of Clanwilliam*.—The main landing quay in the fishing harbour at Lambert's Bay.

(e) *Division of Piketberg*.—(i) The five jetties in the vicinity of the old military camp on Baboon Point at Elands Bay; and

(ii) the jetty of Messrs Marine Products Ltd, situated at the Berg River at Laaipelek.

(f) *Division of Vredenburg*.—(i) The rock lobster landing quay in the fishing harbour at Sandy Point, situated in St Helena Bay;

(ii) the sea-shore between two white concrete beacons marked J1, indicating the northern boundary, and J2, indicating the southern boundary, which is situated on the shore known as Seal-island, between Paternoster Bay and Britannia Bay;

(iii) the sea-shore between two white concrete beacons marked P1 and P2, situated to the east and to the west, respectively, of the factory of Messrs Paternoster Visserie Bpk. at Paternoster;

(v) *Afwerking*.—Alle blootgestelde oppervlakke moet glad en sonder skerp rande of enige ander nadelige gebreke wees.

(5) Alle kreef wat aan boord van enige vissersboot in die Republiek, uitgesonderd die gebied, wat met kreef-fuik opereer, geneem word, moet met behulp van die dekrustersorteerder sorteer word. Met dien verstande dat enige persoon wat enige kreef in stryd met die bepalings van hierdie regulasies vang of in besit daarvan kom sodanige kreef sonder versuim in die see moet terugplaas.

38. Alle kreef of ooskuskreef wat nie in stryd met hierdie regulasies gevang is nie, moet heel gehou word totdat dit aan land of aan wal gebring is: Met dien verstande dat kreefsterte of ooskuskreefsterte aan boord van enige boot vervoer mag word, mits sodanige sterte verpak is ooreenkomstig die bepalings van die standaardspesifikasies van die Suid-Afrikaanse Buro vir Standaard, afgekondig by Goewermentskennisgewing R. 357 van 10 Maart 1972, kragtens die Wet op Standaard 1962 (Wet 33 van 1962).

39. (1) Niemand mag te eniger tyd of op enige plek langs die kus in die gebied begrens deur 'n lyn (geografiese ligging 270°) van die suidelikste punt by Kaap Agulhas en 'n lyn (geografiese ligging 270°) van die noordoewer van die mond van die Kunenerivier, enige kreef of enige deel van sodanige kreef by enige ander plek as die volgende landingsplekke aan land bring nie:

(a) *Afdeling Lüderitz*.—Die aanlegsteiers van die firmas Angra Pequena Viskorporasie Beperk, Sea Products (SWA) Limited en South West African Fishing Industries Limited te Luderitz.

(b) *Afdeling Namakwaland*.—(i) Die aanlegsteiers van die firmas John Ovenstone Ltd en Hicksons Canning Company (S.A.) Ltd, met inbegrip van die strandgebied tussen hierdie twee aanlegsteiers te Port Nolloth;

(ii) die gebied tussen twee wit betonbakens gemerk A1 wat die noordelike grens aandui en A2 wat suidelike grens aandui en wat geleë is op die strandgebied, bekend as Stilbaai, grensende aan die kreeffabriek van die firma Port Nolloth Visserie Beperk te Port Nolloth; en

(iii) die aanlegsteier van die firma Namaqua Canning Company Ltd te Hondeklipbaai.

(c) *Afdeling Vanrhynsdorp*.—(i) Die strandgebied en aanlegsteier tussen twee wit betonbakens gemerk B1 wat die noordelike grens aandui en B2 wat die suidelike grens aandui en geleë is naby die kreeffabriek van die firma North Bay Canning Company Ltd te Doringbaai; en

(ii) die strandgebied en aanlegsteier tussen twee wit betonbakens gemerk C1 wat die noordelike grens aandui en C2 wat die suidelike grens aandui en wat geleë is op die strand naby die aanlegsteier te Dorkinsbaai.

(d) *Afdeling Clanwilliam*.—Die hooflandingskaai in die vissershawe te Lambertsbaai.

(e) *Afdeling Piketberg*.—(i) Die vyf aanlegsteiers in die nabyheid van die ou militêre kamp op Bobbejaanpunt te Elandsbaai; en

(ii) die aanlegsteier van die firma Marine Products Ltd, geleë in die Bergrivier te Laaipelek.

(f) *Afdeling Vredenburg*.—(i) Die kreeflandingskaai in die vissershawe te Sandypunt geleë in St. Helenabaai;

(ii) die strandgebied tussen twee wit betonbakens gemerk J1 wat die noordelike grens aandui en J2 wat die suidelike grens aandui en wat geleë is op die strand bekend as Seal-eiland, tussen Paternosterbaai en Britanniabaai;

(iii) die strandgebied tussen twee wit betonbakens geemerk P1 en P2, geleë onderskeidelik ten ooste en ten weste van die fabriek van die firma Paternoster Visserie Beperk te Paternoster;

(iv) the sea-shore between two white concrete beacons marked E1, indicating the northern boundary, and E2, indicating the southern boundary, and situated at Abdolsbaai to the south of Paternoster;

(v) the sea-shore between two white concrete beacons marked F1, indicating the northern boundary and F2, indicating the southern boundary, and situated on the shore known as Jacobsbaai; and

(vi) the rock lobster landing quay in the fishing harbour at Pepper Bay situated in Saldanha Bay.

(g) *Division of Malmesbury*.—The sea-shore between two white concrete beacons marked G1, indicating the northern boundary, and G2, indicating the southern boundary, and situated on the shore known as Bokbaai.

(h) *Division of the Cape*.—The fish landing quay at Table Bay Docks.

(i) *Division of Wynberg*.—The main fish-landing quay in the fishing harbour at Hout Bay.

(j) *Division of Simonstown*.—The landing place at Witsand, situated between two white concrete beacons marked H1 and H2, respectively.

(2) Notwithstanding subregulation (1) rock lobster may be landed at any point by any person for his own use in quantities not exceeding five (5) per day.

40. (1) No person, except the owners or users of fishing boats registered in respect of a harbour in the Republic, excluding the territory, and licensed to catch rock lobster, shall catch rock lobster in the Republic, excluding the territory: Provided that this stipulation shall not apply to any person catching five rock lobsters per day for his own use.

(2) No person, except the owners or users of fishing boats registered in respect of a harbour in the territory and licensed to catch rock lobster, shall catch rock lobster in the territory: Provided that this stipulation shall not apply to any person catching five rock lobsters per day for his own use.

PART VII

PROTECTION OF CERTAIN OTHER KINDS OF FISH

41. No person shall catch or have in his possession any of the following:

(a) Any crab of a size less than 11,43 cm measured across the broadest part of the back;

(b) any oyster able to pass through a ring 5,08 cm in diameter (inside measurement);

(c) any perlemoen able to pass through a ring 11,43 cm in diameter (inside measurement);

(d) any alikreukel able to pass through a ring 6,35 cm in diameter (inside measurement);

(e) any white mussel able to pass through a ring 3,8 cm in diameter (inside measurement);

(f) any siffie able to pass through a ring 3,175 cm in diameter (inside measurement); or

(g) any female crab or sea-crab in berry (i.e. carrying eggs) or showing signs of having been stripped off the berry.

42. (1) Any perlemoen, wherever caught, shall be retained in a whole state until it is landed: Provided that the provisions of this regulation shall not prohibit the immediate return to the sea of any perlemoen caught in contravention of regulation 41.

(2) All perlemoen caught under the authority of a permit, issued in terms of regulation 59, shall be delivered to a perlemoen processing factory and shall be retained in a whole state until it is delivered to such factory.

43. Any person who caught any "vaalhaai" (*Galeorhinus galeus*) shall land such shark in a whole state.

(iv) die strandgebied tussen twee wit betonbakens gemerk E1 wat die noordelike grens aandui en E2 wat die suidelike grens aandui en wat geleë is te Abdolsbaai ten suide van Paternoster;

(v) die strandgebied tussen twee wit betonbakens gemerk F1 wat die noordelike grens aandui en F2 wat die suidelike grens aandui en wat geleë is op die strand bekend as Jacobsbaai; en

(vi) die kreefflandingskaai in die vissershawe te Peperbaai geleë in Saldanhaabaai.

(g) *Afdeling Malmesbury*.—Die strandgebied tussen twee wit betonbakens gemerk G1 wat die noordelike grens aandui en G2 wat die suidelike grens aandui en wat geleë is op die strand bekend as Bokbaai.

(h) *Afdeling Die Kaap*.—Die vislandingskaai te Tafelbaaidokke.

(i) *Afdeling Wynberg*.—Die hoofvislandingskaai in die vissershawe te Houtbaai.

(j) *Afdeling Simonstad*.—Die landingsplek te Witsand, geleë tussen twee wit betonbakens gemerk onderskeidelik H1 en H2.

(2) Ondanks subregulasie (1), mag kreef op enige plek aan land gebring word deur enige persoon vir sy eie gebruik in getalle van hoogstens vyf (5) per dag.

40. (1) Niemand behalwe die eienaars of gebruikers van vissersbote wat ten opsigte van 'n hawe in die Republiek, uitgesonderd die gebied, geregistreer is, en wat vir die vang van kreef gelisensieer is, mag kreef in die Republiek, uitgesonderd die gebied, vang nie: Met dien verstande dat hierdie bepaling nie van toepassing is op iemand wat vyf krewes per dag vir eie gebruik vang nie.

(2) Niemand behalwe die eienaar of gebruikers van vissersbote wat ten opsigte van 'n hawe in die gebied geregistreer is, en vir die vang van kreef gelisensieer is, mag kreef in die gebied vang nie: Met dien verstande dat hierdie bepaling nie van toepassing is op iemand wat vyf krewes per dag vir eie gebruik vang nie.

DEEL VII

BESKERMING VAN SEKERE ANDER SOORTE VIS

41. Niemand mag die volgende vang of besit nie:

(a) Enige krap wat kleiner as 11,43 cm is, gemeet oor die breedste deel van die rug;

(b) enige oester wat deur 'n ring waarvan die deursnee (binnemaat) 5,08 cm is, kan gaan;

(c) enige perlemoen wat deur 'n ring waarvan die deursnee (binnemaat) 11,43 cm is, kan gaan;

(d) enige alikreukel wat deur 'n ring waarvan die deursnee (binnemaat) 6,35 cm is, kan gaan;

(e) enige witmossel wat deur 'n ring waarvan die deursnee (binnemaat) 3,8 cm is, kan gaan;

(f) enige siffie wat deur 'n ring waarvan die deursnee (binnemaat) 3,175 cm is, kan gaan; of

(g) enige wyfiekrap of wyfie-seekrap wat eiers dra of wat tekens toon dat die eiers afgestroop is.

42. (1) Enige perlemoen, waar ook al gevang, moet heel gehou word totdat dit aan land gebring is: Met dien verstande dat die bepalings van hierdie regulasie nie belet dat enige perlemoen wat in stryd met regulasie 41 gevang is, sonder versuim in die see teruggeplaas word nie.

(2) Alle perlemoen wat ingevolge die magtiging van 'n permit, uigereik kragtens regulasie 59, gevang word, moet aan 'n perlemoenverwerkingsfabriek gelewer word en moet heel gehou word totdat dit aan so 'n fabriek gelewer word.

43. Enigeen wat enige vaalhaai (*Galeorhinus galeus*) vang, moet dit in 'n heel toestand aan land bring.

44. Except as provided in regulation 46, no person shall return to the sea any snoek or any part or any offal of any snoek in the area bounded by the coast-line east from Stompneus Point to the western side of the Berg River Mouth; thence in a straight line due north for one nautical mile; thence in a straight line in a north-westerly direction one nautical mile due north of Stompneus Point; thence in a straight line one nautical mile due south to Stompneus Point.

45. (1) No person shall by means of a rod and line or a handline or a beach trek-seine net catch any of the following species of fish of a size less than the size prescribed for the species concerned, such size to be measured in accordance with the method prescribed in subregulation (2): Provided that any person who has caught any fish mentioned in this regulation which is smaller than the size prescribed, shall, if he forthwith returns it to the water with as little injury as possible, be deemed not to have caught such fish in contravention of this regulation:

- Dageraad (*Chrysoblephus criticeps*): 23 cm;
- Dassie, blacktail or "kolstert" (*Diplodus sargus*): 15 cm;
- Elf, shad or chad (*Pomatomus saltator*): 30 cm;
- Galjoen (*Coracinus capensis*): 20 cm;
- Geelbeck or Cape Salmon (*Atractoscion aequidens*): 40 cm;
- Grunter, blotched (*Pomadasys maculatus*): 25 cm;
- Grunter, spotted, spotted steenbras, "varkie", chor chor or tiger (*Pomadasys operculare*): 30 cm;
- Gurnard or "Knorhaan" (*Trigla capensis*): 15 cm;
- Hottentot (*Pachymetopon blochii*): 22 cm;
- Kabeljou, cob or kob or salmon bass (*Johnius hololepidotus*): 40 cm;
- Leervis or garrick (*Hypacanthus amia*): 38 cm;
- Mackerel or "makriel" (*Scomber japonicus*): 15 cm;
- Mullet or "harder" (*Mugil* or *Liza* spp.): 15 cm;
- Red steenbras or yellow steenbras (*Petrus rupestris*): 30 cm;
- Red Stumpnose, Lucy, Michael or Miggel, "bond dage-raad", "magistraat" or "rooiwitkop" (*Chrysoblephus gib-biceps*): 20 cm;
- Rock-cod (any species) (*Serranus* spp.): 30 cm;
- Roman or daggerhead (*Chrysoblephus laticeps*): 20 cm;
- Sancord or jacobever (*Helicolenus maculatus*): 15 cm;
- Sandfish (*Platycephalus indicus*): 30 cm;
- Scotsman or scotchman (*Polysteganus praeorbitalis*): 20 cm;
- Seventy-four (*Polysteganus undulosus*): 25 cm;
- Silverfish, carpenter of "doppie" (*Argyrozona argy-rozona*): 25 cm;
- Slinger (*Chrysoblephus puniceus*): 23 cm;
- Soldier or "Wittevis" (*Cheimerius nufar*): 23 cm;
- Snoek (*Thysites atun*): 60 cm;
- Stockfish or hake (*Merluccius capensis*): 50 cm;
- White or river steenbras, "Varkbek" or pignose grun-ter (*Lithognathus lithognathus*): 30 cm;
- White Stumpnose (*Rhabdosargus* spp.): 20 cm.

(2) For the purposes of subregulation (1), all fish shall be measured along the side from the tip of the snout to the extreme end of the tail or caudal fin.

46. Any person catching a yellow fin tuna (*Thunnus albacares*) with a mass of less than 3,2 kg, shall immediately return such yellow fin tuna to the sea.

47. (1) No person shall catch or attempt to catch any fish by the method of spearing with the aid of artificial light.

44. Behalwe soos bepaal in regulasie 46, mag niemand enige snoek of enige deel of enige afval van enige snoek in die see in die gebied begrens deur die kuslyn ooswaarts van Stompneuspunt tot by die westelike oewer van die Bergriviermond, daarvandaan in 'n reguit lyn noordwaarts oor 'n afstand van een seemyl, daarvandaan in 'n reguit lyn in 'n noordwestelike rigting tot een seemyl reg noord van Stompneuspunt, daarvandaan in 'n reguit lyn een seemyl reg suid tot by Stompneuspunt, terugplaas nie.

45. (1) Niemand mag deur middel van 'n stok en lyn of 'n handlyn of 'n strandtrekseën enige van die volgende vissoorte wat kleiner is as die grootte wat vir die betrokke soort voorgeskryf is, gemeet ooreenkomstig die metode voorgeskryf in subregulasie (2), vang nie: Met dien verstande dat enige persoon wat enige vis, genoem in hierdie regulasie, wat kleiner is as die voorgeskrewe grootte, gevang het, geag word, indien hy dit sonder versuim met so min besering as moontlik in die water terugplaas, sodanige vis nie in stryd met hierdie regulasie te gevang het nie:

- Dageraad (*Chrysoblephus cristiceps*): 23 cm;
- Dassie, "blacktail" of kolstert (*Diplodus sargus*): 15 cm;
- Elf, "shad" of "chad" (*Pomatomus saltator*): 30 cm;
- Galjoen (*Coracinus capensis*): 20 cm;
- Geelbek of "Cape salmon" (*Atractoscion aequidens*): 40 cm;
- Grunter, gevlek (*Pomadasys maculatus*): 25 cm;
- Grunter, gespikkeld, "spotted" steenbras, varkie, tjor-tjor of "tiger" (*Pomadasys operculare*): 30 cm;
- Harder of "mullet" (*Mugil* of *Liza* spp.): 15 cm;
- Hottentot (*Pachymetopon blochii*): 22 cm;
- Jakopewer of "sancord" (*Helicolenus maculatus*): 15 cm;
- Kabeljou, "cob" of "kob" of "salmon bass" (*Johnius hololepidotus*): 40 cm;
- Klipkabeljou (enige soort) (*Serranus* spp.): 30 cm;
- Knorhaan of "gurnard" (*Trigla capensis*): 15 cm;
- Leervis of "garrick" (*Hypacanthus amia*): 38 cm;
- Makriel of "mackerel" (*Scomber japonicus*): 15 cm;
- Roman of "daggerhead" (*Chrysoblephus laticeps*): 20 cm;
- Rooisteinbras of geelsteenbras (*Petrus rupestris*): 30 cm;
- Rooistompneus, "Lucy", "Michael" of "Migel", bont dageraad, magistraat of rooiwitkop (*Chrysoblephus gib-biceps*): 20 cm;
- Sandvis (*Platycephalus indicus*): 30 cm;
- Silwervis, "carpenter" of doppie (*Argyrozona argy-rozona*): 25 cm;
- Skotsman of "Scotchman" (*Polysteganus praeorbitalis*): 20 cm;
- Slinger (*Chrysoblephus puniceus*): 23 cm;
- Snoek (*Thysites atun*): 60 cm;
- Stokvis (*Merluccius capensis*): 50 cm;
- Vier-en-sewentig (*Polysteganus undulosus*): 25 cm;
- Wit- of riviersteenbras, varkbek of "pig-nose grunter" (*Lithognathus lithognathus*): 30 cm;
- Wittevis of "soldier" (*Cheimerius nufar*): 23 cm;
- Witstompneus (*Rhabdosargus* spp.): 20 cm.

(2) Vir die toepassing van subregulasie (1) moet alle vis in 'n reguit lyn langs die sy vanaf die punt van die snuit tot by die uiterste punt van die stert of stertvin gemeet word.

46. Enigiemand wat 'n geelvintuna (*Thunnus Albacares*) vang met 'n massa van minder as 3,2 kg, moet sodanige geelvintuna sonder versuim in die see terugplaas.

47. (1) Niemand mag enige vis met behulp van kunsmatige lig vang of probeer vang deur dit met 'n spies of visspies te steek nie.

(2) No person shall catch or attempt to catch any fish by means of a gaff, spear, club, flail, stick, stone or similar instrument: Provided that the use of any such implement for killing or securing any fish caught by lawful means is not prohibited.

(3) No person shall catch or attempt to catch any fish except octopus or tjokka (*Sepia spp.*) by the method known as "snatching", that is, by the jerking of a hook in the water with the intention of impaling the fish thereon.

(4) Notwithstanding subregulations (2) and (3), any person may spear or catch soles (*Austroglossus pectoralis*) with a spear or similar instrument for his own use in quantities not exceeding five (5) per day.

48. (1) Except with the written permission of the director, no person shall catch or attempt to catch by means of spear fishing more than five (5) fish of each of the following species or more than two (2) fish of any other species in any one day:

Yellowtail, Garrick, Katonkel, Shad, Spanish Mackerel, Tuna, Barracuda, Snoek, Mackerel, Mullet.

(2) For the purposes of subregulation (1), "spear fishing" means using any spear, harpoon, speargun or any weapon, apparatus or mechanism so constructed as to be capable of being used under water.

49. No person shall catch, attempt to catch or disturb any seahorse (*Hippocampus spp.*) or any pipefish (*Syngnathus spp.*) in the Knysna River between the river mouth and the point where the old road bridge (upper bridge) crosses the river.

50. No person shall, without the written permission of the director, catch, attempt to catch or disturb any dolphin, known also as porpoise, (*Delphinus delphis*, *Lagenorhynchus obscurus* or *Cephalorhynchus heavisidei*).

51. No person shall uproot, pick or collect any sea-fan, also known as "see-tak" (*Lophogorgia flammaea* or *Eunicella papillosa*): Provided that washed-up sea-fans on the seashore may be collected.

52. Any person who catches snoek with a fishing boat in the territory, shall deliver such snoek to a factory in the territory.

53. No person shall catch or disturb oysters, blood-worms, limpets, black mussels, red bait, polychaete-worms or perlemoen in any other way than by hand or by means of an implement, the blade or flat edge of which shall not exceed 3,8 cm.

54. No person shall catch or disturb white mussels by means of any type of spade, fork or plough.

55. No person shall catch or disturb any prawns or bloodworms by means of any type of spade or fork.

56. No person shall remove or convey red bait, oysters, oyster spat or spawn from the Transkeian Territories except with the written authority of the director.

57. (1) Except as provided in subregulation (2), no person shall at any time or at any place, on his own behalf or on behalf of any other person catch, convey or purchase more of the following species of fish than the number or mass stipulated below for each species:

- Alikreukel, ten (10).
- Armadillo, six (6).
- Black mussel, twenty-five (25).
- Bloodworm, five (5).
- Clam, fifteen (15).
- Crab, two (2).
- Limpet, fifteen (15).
- Octopus, two (2).
- Periwinkle, fifty (50).
- Polychaete worm, twenty (20).
- Prawn, fifty (50).

(2) Niemand mag enige vis vang of probeer vang deur middel van 'n haakstok, spies, knuppel, dorsstok, stok, klip of soortgelyke instrument nie: Met dien verstande dat die gebruik van sodanige gereedskap vir die doodmaak of uithaal van vis wat op 'n wettige wyse gevang is, nie belet word nie.

(3) Niemand mag enige vis behalwe seekat of tjokka (*Sepia spp.*) deur middel van die metode bekend as "gryp" vang of probeer vang nie, dit wil sê deur 'n hoek in die water te ruk met die doel om dit deur die vis te steek.

(4) Ten spyte van subregulasies (2) en (3), mag enigiemand tongbis (*Austroglossus pectoralis*) in getalle van hoogstens vyf (5) per dag met 'n spies of soortgelyke instrument vir eie gebruik steek of vang.

48. (1) Behalwe met die skriftelike toestemming van die direkteur, mag niemand deur middel van visjag op enige dag meer as vyf (5) visse van elk van die volgende soorte of meer as twee (2) visse van enige ander soort vang of probeer vang nie:

Geelstert, Katonkel, Spaanse makriel, Tuna, Barracuda, Makriel, Snoek, Harder, Leervis, Elf.

(2) Vir doeleindes van subregulasie (1) beteken "visjag" die gebruik van enige spies, harpoen, spiesgeweer of enige wapen, apparaat of meganisme so vervaardig dat dit onder water gebruik kan word.

49. Niemand mag enige seeperrdjie (*Hippocampus spp.*) of enige pypvis (*Syngnathus spp.*) in die Knysnarivier tussen die riviermond en die punt waar die ou wabrug (boonste brug) oor die rivier gaan, vang, probeer vang of steur nie.

50. Niemand mag sonder die skriftelike toestemming van die direkteur enige dolfyn, ook bekend as tornyn, *Delphinus delphis*, *Lagenorhynchus obscurus* of *Cephalorhynchus heavisidei* vang, probeer vang of steur nie.

51. Niemand mag enige seewaaier, ook bekend as "see-tak", *Lophogorgia flammaea* of *Eunicella papillosa* ontwortel, pluk of versamel nie: Met dien verstande dat seewaaiers wat op die strand uitspoel, versamel mag word.

52. Enigiemand wat met 'n vissersboot in die gebied snoek vang, moet sodanige snoek aan 'n fabriek in die gebied lewer.

53. Niemand mag oesters, bloedwurms, klipmossels, swartmossels, rooi-aas, "polychaete"-wurms of perlemoen op enige ander wyse as met die hand of met 'n werktuig waarvan die lem of platkant hoogstens 3,8 cm breed mag wees, vang of steur nie.

54. Niemand mag witmossels met enige soort graaf, vork of ploeg vang of steur nie.

55. Niemand mag enige garnale of bloedwurms deur middel van enige soort graaf of vork vang of steur nie.

56. Niemand mag sonder die skriftelike magtiging van die direkteur rooi-aas, oesters, oesterbroed of -kuit uit die Transkeise gebied verwyder of vervoer nie.

57. (1) Behalwe soos bepaal in subregulasie (2) mag niemand te eniger tyd of op enige plek, ten behoeve van homself of ten behoeve van enige ander persoon, meer van die volgende soorte vis as die getal of massa hieronder genoem vir elke soort vang, vervoer of koop nie:

- Alikreukel, tien (10).
- Armadillo, ses (6).
- Bloedwurm, vyf (5).
- Gapermossel, vyftien (15).
- Garnaal, vyftig (50).
- Kammossel, tien (10).
- Klipmossel, vyftien (15).
- Krap, twee (2).
- Periwinkle, vyftig (50).
- "Polychaete"-wurm, twintig (20).
- Rooi-aas (sonder dop), 1,8 kilogram.

Razor clam, twenty (20).
 Red bait (without shell), 1,8 kilogram.
 Scallop, ten (10).
 Sea-crab, fifteen (15).
 Sea-urchin, twenty (20).
 Siffie, ten (10).
 White mussel, fifty (50).

(2) Notwithstanding subregulation (1), any person may, on the authority of a permit issued by the director in the form set out in Schedule I, catch, convey or purchase more fish of the species concerned than the number or mass stipulated for each of them.

(3) No person, except a permit holder in terms of the provisions of subregulation (2), shall sell or offer for sale any species of fish mentioned in subregulation (1).

58. No person shall catch, attempt to catch, or disturb any oyster by means of diving: Provided that oysters may be caught, by means of diving by any person for his own use in quantities not exceeding twenty-five (25) per day.

59. (1) Except as provided in subregulation (4), no person shall catch oysters without the authority of a permit in the form set out in Schedule H, and subject to the conditions contained in it.

(2) Any person intending to obtain a permit in terms of subregulation (1) shall forward an application in the form set out in Schedule G together with an amount of five rand (R5) to the director.

(3) A permit shall be valid for the period stated therein and shall not be transferable.

(4) Notwithstanding subregulation (1), any person may catch oysters without a permit for his own use in quantities not exceeding twenty-five (25) per day.

60. (1) Except as provided in subregulation (4), no person shall catch perlemoen without the authority of a permit in the form set out in Schedule I and subject to the conditions contained in it.

(2) Any person intending to obtain a permit in terms of subregulation (1) shall forward an application in the form set out in Schedule G together with the amount of forty rand (R40) to the director.

(3) A permit shall be valid for the period stated therein and shall not be transferable.

(4) Notwithstanding the provisions of subregulation (1), any person may catch perlemoen without a permit for his own use in quantities not exceeding five (5) per day.

(5) Any person, not in possession of a permit issued in terms of subregulation (1), when found in possession of more than five (5) perlemoen, shall be deemed to have caught such perlemoen until the contrary is proved: Provided that this subregulation shall not apply to any fish-shop, restaurant, hotel or any other licensed place of business.

(6) No person who catches perlemoen in terms of the authority granted by subregulation (1), shall catch perlemoen within a distance of one hundred and eighty-five (185) metres seawards from the shore, measured from the high-water mark, in the area bounded by the most southernly point at Cape Point, thence along the shore to the most southernly point at Cape Agulhas.

61. (1) No person, except the owners or users of fishing boats registered in respect of a harbour in the Republic, excluding the Territory, and licensed to catch pelagic fish, shall catch pelagic fish in the Republic, excluding the Territory, by means of any net or netting.

(2) No person, except the owners or users of fishing boats registered in respect of a harbour in the Territory, and licensed to catch pelagic fish, shall catch pelagic fish in the Territory by means of any net or netting.

Seekat, twee (2).
 Seekomkommer, twintig (20).
 Seekrap, vyftien (15).
 Siffie, tien (10).
 Skeermesgapermossel, twintig (20).
 Swartmossel, vyf-en-twintig (25).
 Witmossel, vyftig (50).

(2) Ondanks subregulasie (1) mag enige persoon kragtens 'n permit uitgereik deur die direkteur in die vorm uiteengesit in Bylae I, meer van die betrokke soorte vis as die getal of massa genoem vir elke soort vang, vervoer of koop.

(3) Niemand uitgesonderd 'n permithouer ingevolge die bepalinge van subregulasie (2), mag enige soort vis genoem in subregulasie (1) verkoop of te koop aanbied nie.

58. Niemand mag enige oester vang, probeer vang, of steur by wyse van duik nie: Met dien verstande dat oesters by wyse van duik gevang mag word deur 'n persoon vir eie gebruik in getalle van hoogstens vyf-en-twintig (25) per dag.

59. (1) Behalwe soos bepaal in subregulasie (4) mag niemand sonder die magtiging van en behoudens die voorwaardes voorgeskryf in 'n permit in die vorm uiteengesit in Bylae H, oesters vang nie.

(2) Enige persoon wat voornemens is om 'n permit ingevolge subregulasie (1) te verkry, moet 'n aansoek in die vorm uiteengesit in Bylae G en 'n bedrag van vyf rand (R5) aan die direkteur stuur.

(3) 'n Permit is geldig vir die tydperk daarin genoem en is nie oordraagbaar nie.

(4) Nieteenstaande subregulasie (1), mag enige persoon sonder 'n permit vir sy eie gebruik oesters vang in getalle van hoogstens vyf-en-twintig (25) per dag.

60. (1) Behalwe soos bepaal in subregulasie (4), mag niemand sonder die magtiging van, en behoudens die voorwaardes voorgeskryf in 'n permit in die vorm uiteengesit in Bylae I, perlemoen vang nie.

(2) Enige persoon wat voornemens is om 'n permit ingevolge subregulasie (1) te verkry, moet 'n aansoek in die vorm uiteengesit in Bylae G en 'n bedrag van veertig rand (R40) aan die direkteur stuur.

(3) 'n Permit is geldig vir die tydperk daarin genoem en is nie oordraagbaar nie.

(4) Ondanks subregulasie (1), mag enige persoon sonder 'n permit vir sy eie gebruik perlemoen vang in getalle van hoogstens vyf (5) per dag.

(5) Enige persoon wat in besit van meer as vyf (5) perlemoen gevind word en wat nie 'n permit uitgereik ingevolge subregulasie (1) het nie, word geag sodanige perlemoen te gevang het totdat die teendeel bewys word: Met dien verstande dat hierdie subregulasie nie op enige viswinkel, restaurant, hotel of enige ander gelisensieerde besigheidsplek van toepassing is nie.

(6) Niemand wat kragtens die magtiging verleen by subregulasie (1) perlemoen vang, mag binne 'n afstand van eenhonderd vyf-en-tagtig (185) meter seewaarts vanaf die strand, gemeet vanaf die hoogwatermerk, in die gebied begrens deur die suidelikste punt by Kaappunt, daarvandaan langs die strand tot by die suidelikste punt by Kaap Agulhas, perlemoen vang nie.

61. (1) Niemand behalwe die eienaars of gebruikers van vissersbote wat ten opsigte van 'n hawe in die Republiek, uitgesonderd die gebied, geregistreer is en wat vir die vang van pelagiese vis gelisensieer is, mag met behulp van enige net of netwerk pelagiese vis in die Republiek uitgesonderd die gebied vang nie.

(2) Niemand behalwe die eienaars of gebruikers van vissersbote wat ten opsigte van 'n hawe in die gebied geregistreer is en wat vir die vang van pelagiese vis gelisensieer is, mag met behulp van enige net of netwerk pelagiese vis in die gebied vang nie.

62. No person on a fishing boat shall return to the sea or intentionally permit to escape from the net, any pelagic fish caught from such boat, or any part of such pelagic fish, except if the fishing boat and its crew will be endangered if such fish is not returned to the sea or permitted to escape from the net.

63. (1) All pelagic fish received by a factory, shall be weighed by the factory.

(2) The contrivance which shall be used for the weighing of pelagic fish in terms of subregulation (1) shall meet the following requirements:

(a) The contrivance shall consist of an automatic "Servo Balance" fish scale and a feeder system to such scale.

(b) The scale shall be installed in such manner and the feeder system of such nature that no fish shall be able to pass the scale without being weighed and the weight of it being recorded on the scale and there shall be no flow pass or "side path".

(c) The scale shall, while it is being used for the weighing of pelagic fish, be sealed properly and the meant scale is for the purposes of this regulation regarded as sealed property if it is proven that it has been sealed by a person who is employed by the company which has supplied the scale or which is responsible for the maintenance thereof, or by an authorised officer of the Division of Weights and Measures of the Department of Commerce.

(d) The weighing capacity of the scale shall not be less than the pumping capacity of the feeder system.

(e) The feeder system shall be of such nature that the fish shall not accumulate at any point on the conveyor belt.

(f) All joints, welds or any other junctures in the feeder system shall be strengthened sufficiently to ensure that all fish shall be conveyed directly to the scale.

(g) The scale shall be of such nature while in use that during the off-loading of fish there shall be no entrance to the scale but the scale mechanism and the reading of the scale shall be visible.

PART VIII

LIMITATIONS IN RESPECT OF NETS AND FISHING WITH NETS

64. (1) No person shall carry on any boat, or use for fishing any net or netting, for the purpose of catching pelagic fish, with a mesh measuring less than 2,8 cm stretched (from inside of knot or joint to inside of knot or joint), i.e. 1,4 cm bar.

(2) No person shall use for fishing any beach trek-seine in respect of any fishing boat authorised to catch pelagic fish for—

(i) canning or the production of fish meal or fish oil; or

(ii) sale to any person for the purpose of canning or the production of fish meal or fish oil.

65. (1) No person shall, without a permit issued by the director, carry on any boat or use for fishing any purse-seine or encircling net of any size.

(2) No person shall use for fishing any beach trek-seine net, staked or set net or drift net with a mesh measuring less than 4,4 cm stretched (from inside of knot or joint to inside of knot or joint), i.e. 2,2 cm bar.

66. (1) No person shall use any staked, set or drift net or any beach trek-seine net within a distance of six nautical miles from the high-water mark except under the authority of a permit issued by the director in the form set out in Schedule L.

62. Niemand op 'n vissersboot mag enige pelagiese vis wat vanaf sodanige vissersboot gevang is, of enige gedeelte van sodanige pelagiese vis, in die see terugwerp of dit doelbewus uit die net laat ontsnap nie, tensy die vissersboot en sy bemanning in gevaar gestel sal word as die vis nie teruggewerp of toegelaat word om uit die net te ontsnap nie.

63. (1) Alle pelagiese vis wat deur 'n fabriek ontvang word, moet deur die fabriek geweeg word.

(2) Die toestel wat vir die weeg van pelagiese vis ingevolge subregulasie (1) gebruik moet word, moet aan die volgende vereistes voldoen:

(a) Die toestel moet bestaan uit 'n outomatiese "Servo Balans"-visskaal en 'n toevoerstelsel tot sodanige skaal.

(b) Die skaal moet op sodanige wyse geïnstalleer en die toevoerstelsel van sodanige aard wees dat geen vis verby die skaal kan gaan sonder dat sodanige vis geweeg en die gewig daarvan op die skaal aangeteken word nie, dit wil sê daar mag geen verbystroom of "sybaan" in die toevoerstelsel wees nie.

(c) Die skaal moet, terwyl dit gebruik word vir die weeg van pelagiese vis, behoorlik verseël wees en bedoelde skaal word geag by die toepassing van hierdie regulasie behoorlik verseël te wees indien bewys word dat dit deur iemand in diens van die maatskappy, wat die skaal verskaf het of vir die onderhoud daarvan verantwoordelik is, of deur 'n gemagtigde beampte van die Afdeling Mate en Gewigte van die Departement van Handel verseël is.

(d) Die weegkapasiteit van die skaal mag nie minder wees as die pompkapasiteit van die toevoerstelsel nie.

(e) Die toevoerstelsel moet van sodanige aard wees dat die vis nie op enige plek op die vervoerband kan ophoop nie.

(f) Alle laste, sweiswerk of ander aanhegtingspunte in die toevoerstelsel moet voldoende versterk wees om te verseker dat alle vis regstreeks na die skaal vervoer word.

(g) Die skaal moet van so 'n aard wees terwyl dit in gebruik is dat daar tydens die aflaai van vis geen toegang tot die skaal is nie maar dat die meganisme van die skaal en die skaalaflesing wel sigbaar is.

DEEL VIII

BEPERKINGS TEN OPSIGTE VAN NETTE EN VISVANG MET NETTE

64. (1) Niemand mag enige net of netwerk met 'n maas van minder as 2,8 cm wanneer gespan (van binnekant van knoop of lasplek tot binnekant van knoop of lasplek), d.w.s. met skakels van 1,4 cm, vir die vang van pelagiese vis op enige boot hê of vir visvang gebruik nie.

(2) Die verbod in subregulasie (1) geld nie ten opsigte van enige vissersboot wat gemagtig is om pelagiese vis vir—

(i) inmaak of die vervaardiging van vismeel of visolie; of

(ii) verkoop aan enige persoon vir die doel van inmaak of die vervaardiging van vismeel of visolie; te vang nie.

65. (1) Sonder 'n permit deur die direkteur uitgereik, mag niemand enige midwaterreilnet of beursseën van enige grootte op enige boot hê of vir visvang gebruik nie.

(2) Niemand mag enige strandtrekseën, span-, stel- of dryfnet met 'n maas van minder as 4,4 cm wanneer gespan (van binnekant van knoop of lasplek tot binnekant van knoop of lasplek), d.w.s. met skakels van 2,2 cm, vir visvang gebruik nie.

66. (1) Niemand mag binne ses seemyl vanaf die hoogwatermerk enige strandtrekseën of enige span-, stel- of dryfnet gebruik nie, behalwe kragtens 'n permit uitgereik deur die direkteur in die vorm uiteengesit in Bylae L.

Conditions.

1. This permit is not transferable.
2. The permit holder shall only not catch oysters in the following areas:

Date

Director of Sea Fisheries

SCHEDULE I

REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF INDUSTRIES

SEA FISHERIES ACT, 1973

PERMIT TO CATCH PERLEMOEN

THIS PERMIT IS NOT TRANSFERABLE

Valid to 31 December 19.....

Name of permit holder.....

Address.....

Registration number of boat.....

Amount paid, receipt of which is acknowledged hereby.....

Forty rand (R40).

This permit authorises the holder thereof and no other person to catch perlemoen provided that he is equipped with diving apparatus connected by means of air supply pipes to the fishing boat into which his catch is loaded.

This permit is issued subject to the condition that the holder thereof shall furnish the Director of Sea Fisheries with the information required by him.

Date

Director of Sea Fisheries

SCHEDULE J

DEPARTMENT OF INDUSTRIES

SEA FISHERIES BRANCH

SEA FISHERIES ACT, 1973

PERMIT TO CATCH, CONVEY, POSSESS, PURCHASE, SELL OR BE IN POSSESSION OF CERTAIN SPECIES OF SEA ANIMALS

Permit No.....

Authority is hereby granted in terms of regulation..... to..... of..... * to catch, convey, possess, purchase, sell or be in possession of, during the period and in the area mentioned hereunder, the following species of marine animals which shall not exceed the quantity of mass stated below:

Period of authority.....

Operative area or place.....

Species

Maximum quantity or mass

Conditions

1. This permit is not transferable.
2. The provisions of the Sea Fisheries Act, 1973, and the regulations promulgated in terms of the Act, must be complied with.

Date

Director of Sea Fisheries

Private Bag
Sea Point
C.P.

* Delete whichever is inapplicable.

SCHEDULE K

REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF INDUSTRIES

SEA FISHERIES ACT, 1973

APPLICATION FOR A PERMIT TO USE A STAKED, SET-DRIFT OR BEACH TREK-SEINE NET

Mr/Mrs/Miss,

Full name.....

Residential address.....

Age..... Identity number.....

Voorwaardes

1. Hierdie permit is nie oordraagbaar nie.
2. Die permitthouer mag slegs/nie in die volgende gebiede oesters vang nie:

Datum

Direkteur van Seevisserye

BYLAE I

REPUBLIEK VAN SUID-AFRIKA

DEPARTEMENT VAN NYWERHEIDSWESE

WET OP SEEVISSERYE, 1973

PERMIT VIR DIE VANG VAN PERLEMOEN

HIERDIE PERMIT IS NIE OORDRAAGBAAR NIE

Geldig tot 31 Desember 19.....

Naam van permitthouer.....

Adres.....

Registrasienuommer van boot.....

Bedrag betaal, waarvan ontvangs hierby erken word.....

Veertig rand (R40).

Hierdie permit magtig die houer daarvan, en geen ander persoon nie, om perlemoen te vang, op voorwaarde dat hy toegerus is met duik-apparaat wat deur middel van lugvoorsieningspype verbind is met die vissersboot waarin hy sy vangs laai.

Hierdie permit word uitgereik onderworpe aan die voorwaarde dat die houer daarvan die Direkteur van Seevisserye moet voorsien van die inligting wat deur hom verlang word.

Datum

Direkteur van Seevisserye

BYLAE J

DEPARTEMENT VAN NYWERHEIDSWESE

TAK SEEVISSERYE

WET OP SEEVISSERYE, 1973

PERMIT OM SEKERE SOORTE SEEDIERE TE VANG, TE VERVOER, TE BESIT, TE KOOP, TE VERKOOP, OF IN BESIT DAARVAN TE WEES

Permitnommer.....

Magtiging word hierby ingevolge regulasie.....

aan..... van.....

verleen om gedurende die tydperk en in die gebied hieronder vermeld, die volgende soorte seediëre, wat nie die hoeveelhede, of massa hieronder genoem, te bowe mag gaan nie, te vang, te vervoer, te besit, te koop, te verkoop, of in besit daarvan te wees.*

Tydperk van magtiging.....

Geldige gebied of plek.....

Soort

Maksimum hoeveelheid of massa

Voorwaardes

1. Hierdie permit is nie oordraagbaar nie.
2. Die bepalinge van die Wet op Seevisserye, 1973, en die regulasies ingevolge die Wet uitgevaardig, moet nagekom word.

Datum

Direkteur van Seevisserye

Privaatsak
Scepunt
K.P.

* Skrap wat nie van toepassing is nie.

BYLAE K

REPUBLIEK VAN SUID-AFRIKA

DEPARTEMENT VAN NYWERHEIDSWESE

WET OP SEEVISSERYE, 1973

AANSOEK OM 'N PERMIT VIR DIE GEBRUIK VAN 'N SPAN-, STEL- OF DRYFNET OF 'N STRANDTREKSEËN

Mnr./Mev./Mej.

Volle naam.....

Woonadres.....

Ouderdom..... Identiteitsnommer.....



DEPARTMENT OF COMMERCE, INDUSTRY AND TOURISM

APPLICATION FOR COMMERCIAL FISHING:-

INDEX NO:

ILIBUZO
ENQUIRIES

- (1) Name of Company:-
- (2) Surname of Applicant:-
- (3) First Names:-
- (4) Nationality:-
- (5) Sex:-
- (6) Passport No:- Issued @:- on:-
- (7) Expiry Date:-
- (8) Address of Applicant:-
.....
- (9) Species of Fish to be caught:-
.....
- (10) Fishing Methods:-
- (11) Estimated Daily Catch:-
- (12) Area of Fishing:-
- (13) Capital Investment in Project:-
- (14) Profitability of Project :-
.....
- (15) Experience and Expertise:-
- (16) Total Staff Compliment:- Transkeians:- Non Transkei-
ans:-
- (17) Share Holding No. and Percentage:- Transkeians:- Non Transkeians:-
.....

Signature of Applicant: Date: 19.....