FISHING RIGHTS, REDISTRIBUTION AND POLICY: THE SOUTH AFRICAN COMMERCIAL T.A.C. FISHERIES

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ABSTRACT

The main objective of this thesis is to provide an analysis of the economic logic behind fisheries policy and redistribution in South African. An examination of the institutional and organizational evolution reveals that South African fisheries policy followed the world trend in the movement toward quota management systems. However, it is argued that due to the peculiarities of the Apartheid political system, South Africa developed a unique and persistent structure of individual fishing rights that resulted in a transfer of power from the fisher to monopsonistic, and subsequently vertically integrated, fish processing companies. Problems, however, arose with the need to redistribute fishing rights to previously repressed racial groups.

It is proposed that, within a specific form (TAC), the structure of individual fishing rights can be decomposed into four operational rules, namely, the right of participation, asset size, tradability and duration of term. Policy design is restricted to a feasible set of rules that impact on the flexibility of the system, the incentives facing private fishing companies and fishers, the efficiency of the fisheries management plan and finally the effect it has on a redistribution strategy. Within this analytical framework, South Africa's policy yields a very flexible system favourable to monopsonistic industrial organisation. However, by adding a redistribution constraint, this structure has a number of important effects. First, as new quota holders are added the information costs for effective fisheries management increase exponentially. Second, the transaction costs to private fishing companies are increased. Third, only the resource rent is redistributed (weak redistribution).

Next, the micro to small vessel fisheries, the medium vessel fisheries and the large vessel fisheries are examined separately. The major aim is to determine, within the available data, the effect that a weak redistribution policy (redistribution of the resource rent), has on strong redistribution (redistribution of fishing capital and skills). The evidence definitely supports the analytical framework and suggests that fundamentally the structure of individual fishing rights, which evolved in response to a monopsonistic industrial organisation during the apartheid era in South Africa, works against strong redistribution. Also, that different fisheries face different constraints and that these should in certain instances be treated separately.

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CHAPTER ONE
INTRODUCTION AND CLASSIFICATION

1.1 INTRODUCTION

Fishing is a very small sub-sector in the South Africa economy; it contributes less than 0.4% to GDP and employs 0.2% of the labour force (Hersoug, 2002:23) and this includes the fishing operations, shore-based operations, fish processing facilities and the marketing of fish products. Furthermore, most of the marine living resources are already fully exploited and in some cases over-exploited (Booth & Hecht, 2000) and are unlikely to contribute anything to economic growth. However, the fishery does provide an important case study on the redistribution of real economic resources in a country characterized by racial inequalities of income, skills and capital, by large income differences between the rich and poor, and by large corporate conglomerates. Within the context of a classification based on economic logic, the major aim of this thesis is to provide a framework from which to think about the main commercial fisheries and the problem of redistribution and black economic empowerment, particularly when the state can play a more active role here than it can in other parts of the private sector.

The fundamental issue in managing fisheries is that they are economic systems with severe design constraints; namely, failure to abide by an *a priori* biologically determined constraint is more severe than other kinds of errors. The design problem is to create a system that, when implemented, minimizes the informational requirements and transaction costs necessary to enforce the design parameters. This means aligning as closely as is possible individual incentives to public incentives, namely, conserving the resource for future generations. In this sense, property right regimes and the design of individual property rights within these regimes is important. The current situation is that the Law of the Sea dictates that the management of all marine living resources occurring within 200 nautical miles from the shore is the responsibility of that coastal state (Bjorndal & Munro, 1998:179). The state usually allocates to individuals the right to exploit these resources but within certain biological parameters. It is the design of the individual fishing rights that establishes the incentive structure on which: i) fishers as economic agents act, ii) the

informational requirements necessary to implement and enforce the design parameters are set, iii) the industrial organization of the fishing industry is determined and iv) the efficiency of the system is ultimately resolved.

In a world concerned with economic efficiency and free markets, the aspect that marks the fisheries sector is that all coastal states have international sanction to allocate individual fishing rights, and thus also real economic resources and not as a form of social welfare, to deserving candidates. In other words, fisheries provide good case studies on direct distribution and redistribution policies in all countries. It is precisely for this reason, and the ability to design the fisheries economic system, that they are worth studying, particularly when other industries are undoubtedly more important from a straight economic efficiency and growth perspective. However, to place the approach and structure of the thesis into a frame of reference it is important to first provide a classification, based on economic logic, of the South African commercial fisheries.

1.2 CLASSIFICATION OF SOUTH AFRICA'S FISHERIES

The purpose of this section is to place the South African commercial fisheries into a broad classification system of valuable natural resources and the traditional resource management classification accepted in South Africa. The aim is to provide a more useful operational classification based on economic logic and a single simple indicator, namely, the length of the fishing vessel. This operational classification is adapted from Mather et al (2002): An Economic and Sectoral Study of the South African Fishing Industry (ESS).

1.2.1 Fisheries as Valuable Natural Resources

According to Perman et al (1996) and Dasgupta & Heal (1979) the primary division of natural resources should be based on their potential to regenerate from a given stock, or to continue as a flow, in economically significant time. The stock of living natural resources in its pristine state is limited by the carrying capacity of the environment, but can become extinct due to the ability of humans to overexploit or as a result of natural catastrophes. Wild living marine resources are living stock resources that are renewable in economically significant time—oil and natural gas, for

example, are renewable but not in economically significant time. Bjorndal & Munro (1998:153) broadly divide the world's fisheries into wild stocks (or capture fisheries) and cultivated stocks. Capture fisheries can further be divided into wild inland (or freshwater) stocks and wild marine (or saltwater) stocks with wild estuarine fish stocks occur at the interface of inland and marine fish resources. Cochrane & Payne (1998:76-85) further classify the South African marine capture fisheries into the commercial fisheries, a subsistence fishery and a recreational fishery. Figure 1.1 below provides a diagrammatic classification of the South African commercial marine capture fishery within the framework of natural resources.

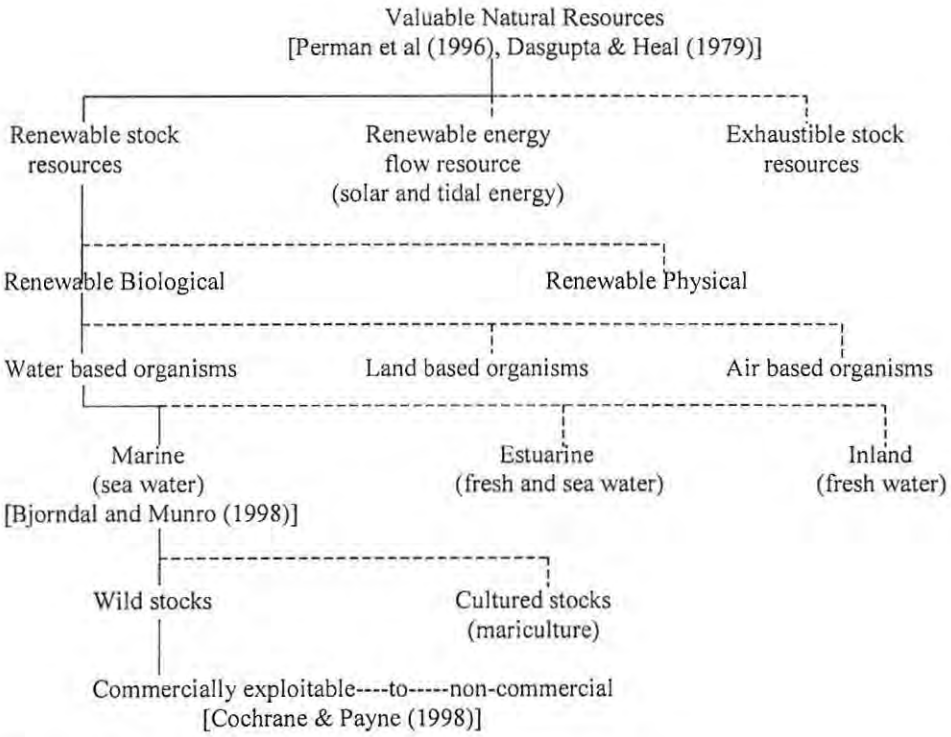

Figure 1.1: The classification of valuable natural resources.

Following Perman et al (1996), and Dasgupta & Heal (1979) the first tier divides the natural resources into three groups and the second tier into two groups. The first tier of natural resources—renewable stock resources— is of interest and is grouped in terms of their ability to regenerate in significant economic time. Scott (1955), for example, within a dynamic capital theoretic framework explains the concept of stocks, and flows from the stock, in the natural environment and provides the economic rationale for conservation of privately owned natural resources. The second

tier distinguishes renewable stock resources in terms of renewable biological and renewable physical stock resources. It then makes sense to divide the biological resources into air-, land- and water-based organisms to make a third tier. Using the Brjondal & Munro (1998:215) taxonomy, all water born organisms can be separated into cultured stocks (aquaculture) and wild stocks—a fourth tier. The wild stocks of living marine organisms are further divided on a utilitarian basis into a fifth tier: exploitable and non-exploitable stocks. Although there is some overlap, the exploitable stocks fall broadly into commercial, subsistence and recreational (Cochrane & Payne 1998:76-85).

1.2.2 Cochrane and Payne (1998) Classification

As previously stated, Cochrane & Payne (1998:76-85) broadly classify the South African marine capture fisheries into commercial, subsistence and recreational. They (1998:76) further divide, illustrated in figure 1.2, the commercial fisheries according to their accepted resource management groups in South Africa, namely, the demersal fisheries, the pelagic fisheries, a very heterogeneous line fish fishery, the lobster fisheries, the abalone fishery and all other fisheries.

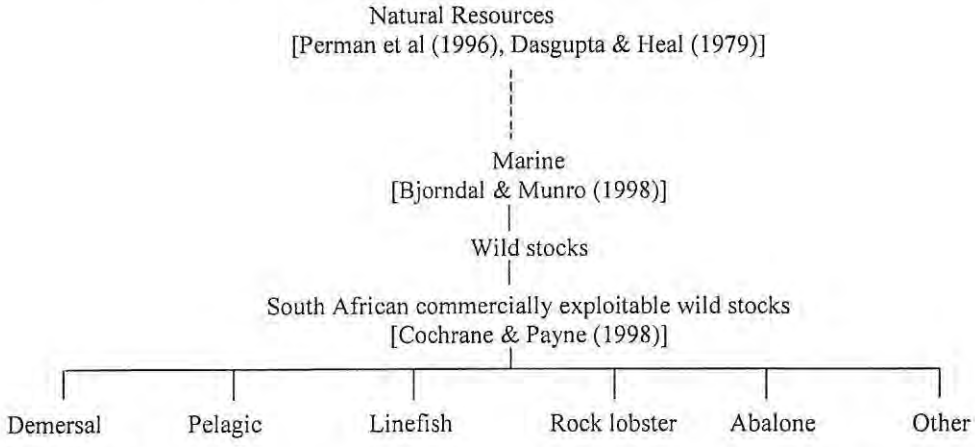

Figure 1.2: The taxonomy of commercially exploitable marine fisheries and the Cochrane & Payne (1998) classification of the South African commercial marine capture fisheries.

In the above system, however, the demersal and pelagic groupings are classified according to their habitat, the line fish are lumped together by general harvesting gear type and the rock lobster and the abalone fisheries are classified by species. Further, i) the demersal grouping comprises four distinct fisheries, ii) six fisheries make up the

line fish category, iii) there are two rock lobster fisheries, iv) the pelagic group has large pelagic species (for example tuna) and small pelagic species (anchovy and pilchard), v) the abalone fishery is a single species one, and vi) at least one important fishery, the Kwa-Zulu Natal prawn fishery, in the 'other' category.

The four demersal fisheries are a deep-sea hake trawl fishery, a long-line hake fishery, a hand-line hake fishery and an inshore trawl fishery. They target the hake species, namely deep-water hake (*merluccius paradoxus*) and shallower water hake (*merluccius capanesis*). Only the inshore trawl fishery targets sole (*austoglossus pectoralis*). These fisheries all use different size fishing vessels and different fishing gear. Deep sea hake trawl fishing uses very large vessels capable of staying at sea for an extended period and employs trawling as a method of harvesting (see chapter 7). The inshore trawl fishery targets both hake and sole and uses medium to large fishing vessels (see chapter 6). Medium sized fishing vessels are used in the hake long-line fishery and small fishing vessels in the hake hand-line fishery. From an economic perspective, the capital asset costs involved in these fisheries differ substantially.

The line fish category consists of at least six distinct fisheries that use lines as a harvesting method. Strictly speaking the hake long-line and hake hand-line fisheries are line fisheries. The squid jig fishery, the tuna bait-boat fishery and the shark long-line experimental fishery all use medium-sized fishing vessels. Medium to large fishing vessels are used in the tuna long-line fishery and very large capital-intensive vessels equipped with long-line harvesting gear are used in the Patagonian toothfish fishery. Finally, the general line-fish fishery is essentially a multi-species fishery that predominantly uses small fishing vessels to catch table fish. These vessels are licensed either as part-time commercial (A permits) or full-time commercial (B permits).

The rock lobster category includes two very different rock lobster (crawfish) fisheries. The west coast rock lobster (*jasus lalandii*) occurs relatively close to the shore and this fishery utilizes mainly small to very small fishing vessels (see chapter 5). On the other hand, the south coast rock lobster (*palinurus gilchristi*) fishery is a deep-water one that uses large vessels to harvest the resource (see chapter 8). The small pelagic category comprises a multi-species fishery that targets mainly sardines (*engraulis*

capensis) and pilchards (*sarninops sagax*) using purse seine harvesting gear. Medium-sized vessels are used (see chapter 6). Similarly, the abalone category is a single fishery. Abalones (*haliotis midae*) are harvested near to the shore using very small support-based vessels and labour-intensive methods of capture—divers harvest the abalone (Pulfrich, 2001).

The above classification scheme, although useful in biological (resource) management, does not provide a logical base from which to analyze the South African commercial fisheries. Accordingly, the 15 most important fisheries will be reclassified along operational criteria, essentially by introducing a division by vessel size. Although this thesis is primarily concerned with those fisheries managed by a total allowable catch (TAC), the scheme below also includes the fisheries managed by total allowable effort (TAE).

1.2.3 An Operational Classification

This classification scheme first groups each fishery into its operational vessel length and thus also into a minimum possible enterprise size (micro to small, medium, and large) based on the length of the fishing vessel. This distinction is important from a number of points of view:

a The distance from the shore that the fishing vessels operate is a positive function of their length (also their size measured in gross registered tonnage—GRT—and their fishing power measured in kilowatts of power—Kwt[1]). Therefore the classification distinguishes between fisheries that operate near to the shore, fisheries that harvest within a depth of 100m (inshore fisheries) and fisheries that target species occurring deeper that 100m (deep-water fisheries).

b The length of the vessel is also a function of its cost. The cost of the vessel and gear determine the group of users that need to be excluded. The near-shore fisheries usually have commercial, subsistence and recreational fisheries targeting the same species (for example, west coast rock lobster and abalone). Because the costs of entry are comparatively low and the resource is easily accessible, the group of users that needs to be policed is the local public,

[1] In fact GRT and fishing power is a better measure than length, but the South African data on these characteristics is less reliable and incomplete.

particularly if the species is valuable. As the vessel size increases and the further from the shore it operates, the more the capital assets cost. This acts as a natural barrier to entry, but the risk of illegal foreign fishing increases. In other words, enforcement strategies change with the length of the vessel.

c One of the redistribution and black economic empowerment strategies used by the South African state fisheries authority, Marine and Coastal Management (MCM), is to create small fishing businesses (RSA, 2001:6).

The following enterprise size grouping, table 1.1, is based on the average surveyed market value (Mather et al, 2002) of micro and small vessels, medium length vessels and large vessels.

Table 1.1: An enterprise classification system.

Enterprise group	Size-groups: vessels (meters)	Number of vessels surveyed	Size-group *$AvgK_m$ (R million)
Micro to small vessels	3m - 5m	445	0.07
	> 5m - 8m	299	0.17
	> 8m - 12m	108	0.31
	>12m - 14m	60	1.01
Medium vessels	>14m - 18m	173	1.22
	>18m - 20m	86	1.53
	>20m - 25m	79	1.74
	>25m - 30m	30	3.60
	>30m - 35m	18	5.28
Large vessels	>35m - 40m	13	8.28
	>40m - 50m	35	11.67
	>50m - 60m	7	10.64
	>60m - 70m	9	14.00
	>70m	7	20.30

Data source: Mather et al, (2002)
*AvgKm: Average market value of the vessels in either the size-group or class-group

The micro to small vessel group is made up of vessels smaller than 14m in length and with an average market value of just over R1 million. In number this group comprises the majority of the fishing fleet. The medium vessel fisheries range in length from greater than 14m to 35m and have a market value between R1.2 million and R5.3 million. The large vessel fisheries use fishing vessels larger than 35m and with large average market values. The above results should, however, be interpreted with caution; the cleaned survey data does not provide a significantly large sample size on a fishery-by-fishery basis to make statistically significant interpretations (Mather et al, 2002). The results do, however, provide background logic to linking vessel length with possible enterprise size.

The second step in the system is to classify each South African fishery according to its median vessel length, namely, micro to small, medium or large. Within each vessel length, grouping each fishery is further separated into those managed primarily by a total allowable catch (TAC) or a total allowable effort (TAE). Fisheries management systems are discussed further in chapter 4. Below, table 1.2, is the classification based on median vessel sizes in each fishery adapted from Mather et al (2002).

Table 1.2: The operation classification of fisheries based on median vessel size and management regime.

Micro to small		Medium		Large	
TAC	TAE	TAC	TAE	TAC	TAE
abalone WCRL[1]	line-fish hakeHL[2]				
		hakeLL[3] prawnT[4] pelagicT[5] inshoreT[6]	sharkLL[7] tuna BB[8] squid J[9] tuna LL[10]		
				SCRL[11] DSHT[12]	toothfish

Source: Mather et al, 2002

[1]: west coast rock lobster fishery, [2]:hake hand-line fishery, [3]: hake long-line fishery, [4]: prawn trawl fishery, [5]: pelagic trawl fishery, [6]: inshore trawl fishery, [7]: shark long-line fishery, [8]: tuna bait-vessel fishery, [9]: squid jig fishery, [10]: tuna long-line fishery, [11]: south coast rock lobster fishery, [12]: deepsea hake trawl fishery

The scheme presented in figure 1.2 is adapted by removing the bottom tier suggested by Cochrane and Payne (1998) and replacing it with a vessel-based operational classification described in the above section. This is illustrated in figure 1.3 below.

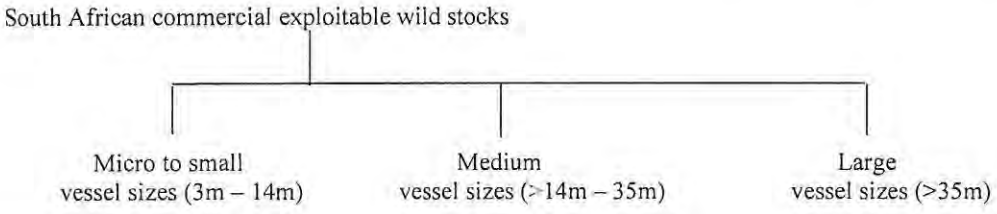

Figure 1.3: A vessel based classification scheme

To complete the classification system, the 15 major South African fisheries are arranged under their median vessel sizes and their principal management regimes (TAC or TAE). Figure 1.4 below provides an illustration of the micro to small vessel

fisheries, namely, the abalone fishery, the west coast rock lobster fishery, the traditional line fish fishery and the hake hand line fishery.

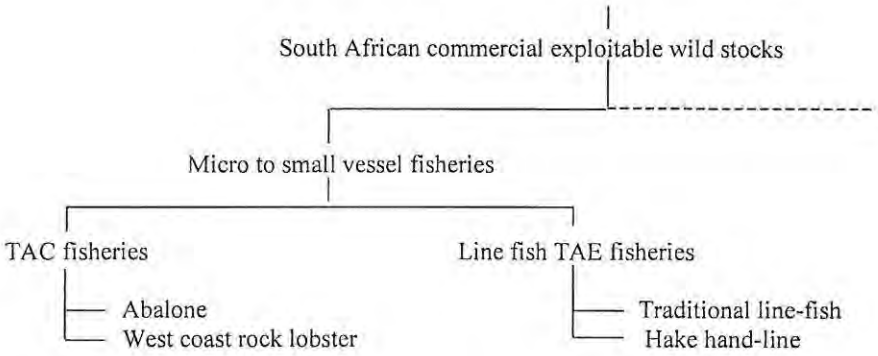

Figure 1.4: The micro to small vessel fisheries

The medium vessel based classification is also grouped on resource management and harvesting criteria. The medium vessel fisheries comprise eight of the 15 major fisheries. These fisheries are dominated by the line fish TAE fisheries. The small pelagic and inshore trawl fisheries are grouped together even though the pelagic fishery uses a purse seine method of capture and the inshore trawl fishery trawl nets. Both are managed according to TAC criteria and use similar size vessels. The fisheries that fall into this group of the vessel-based classification are presented on figure 2.5 below.

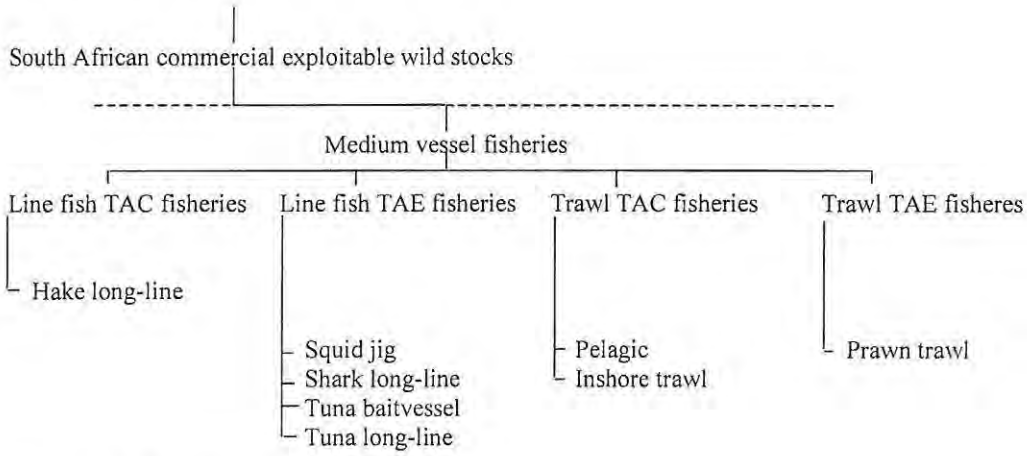

Figure 1.5: The medium vessel fisheries

To complete the classification system the remaining three fisheries all use large vessels to harvest their particular catch (deepsea hake, south coast rock lobster and Patagonian toothfish). Again, these fisheries are grouped on the basis of manangement regimes. A three way classification scheme would also be appropriate given that all three fisheries use very different methods of capture and gear. Lumping the south coast rock lobster fishery with the deepsea hake fishery is justified on the grounds that they are both TAC fisheries (similar in effect to lumping the pelagic trawl and inshore trawl fisheries together). It would not be incorrect to create separate and distinct categories; however, from an individual fishing rights distribution point of view, similar principles apply to both fisheries. Figure 2.6 below illustrates the large vessel fishery classification.

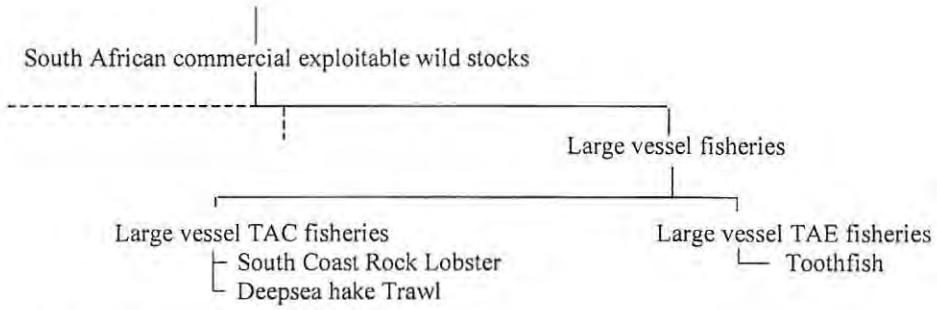

Figure 1.6: The large vessel fisheries

The 15 most important commercial South African fisheries are now classified according to the operational variable of vessel length, management regime and to a limited extent fishing gear type. To start an economic analysis of the South African fisheries, this classification scheme is a fundamental starting point. Due to the large number of fisheries, this thesis focuses only on the most important fisheries that are managed by means of a TAC. These are i) the single-species west coast rock lobster and abalone fisheries in the micro to small vessel category, ii) in the medium vessel category, the multi-species inshore trawl and pelagic fisheries and the hake long-line fishery and iii) the south coast rock lobster and deepsea hake trawl single-species fisheries from the large vessel group. Although the hake long-line fishery is a medium vessel TAC fishery and is very important from a government redistribution point of view, it is a relatively new fishery (it started commercial fishing in 1998 but

was hindered by legal indictments and only took off after 2000) with limited vessel- and fishery-specific data. For this reason the description included in chapter 6 is covered only briefly.

1.3 METHOD AND STRUCTURE

One of the many constraints in the developing world is the availability of consistently collected micro-level data and analysis on specific sectors in their economies. The South African fishery is no exception. With a focus on the major commercial TAC fisheries, this thesis attempts, with a lack of good microeconomic data and no prior economic policy analysis in any of the commercial fisheries, to examine the logic behind fisheries policy and redistribution in South Africa. The approach is accordingly institutional in that it focuses initially on the evolution of fisheries policy both in South Africa and in an international context. However, it also uses other economic tools where appropriate. Recognising that fish processing and marketing are fundamentally related to the harvesting activities, the fishery is, however, analysed in terms of the fishing operations only. The number of fisheries selected and analysed is relatively large, but for comparison it is important to get a fair spread of fisheries that utilise vessels that fall into all three vessel-length categories.

From this foundation, the fundamentals of the design of individual fishing rights can be established. These fundamentals in turn, when arranged in various ways, determine the efficiency of the fisheries management system. With an understanding of the system efficiency, and within the available data, the South African fisheries management approach is analysed by examining separately the micro to small vessel fisheries, the medium vessel fisheries and the large vessel fisheries. The systems analysis of fisheries management (informed by an evolutionary approach to understanding the logic behind its development and an analysis of the various fisheries) provides additional insights into aligning incentive structures, minimising informational and transaction costs, and finally in the design of policy.

The thesis begins by documenting, in chapter two, the institutional and organisational evolution of the management of the South African TAC fisheries. Three major periods are defined:

a the period before the creation of a 200 nautical mile fisheries exclusive economic zone (EEZ) in 1977,

b a period from 1977 to 1998 where quota management systems developed, some preliminary distributional issues were implemented and others discussed, and

c a period starting with the passing of a new Act and a focus on redistribution and black economic empowerment. The chapter ends with a close look at the last medium-term individual fishing rights allocation round in 2001.

Essentially, the chapter aims to show that the design of individual fishing rights developed in response to a concentrated market structure and accordingly determined the institutional and organisational evolution of the fisheries management system. It also illustrates that fisheries management has not substantially changed since it began in South Africa and still favours large corporations over fishers.

The aim of chapter 3 is to put fisheries management in South Africa into a global context. Fisheries management around the world is first about the evolution of the property right regimes, primarily resulting from population growth, economic development and technological advances. This evolution resulted in changes in the economic thinking on the fisheries problem, fisheries policy and fisheries management. For the purposes of explanation a simple bioeconomic model is used to illustrate four broad groups of property right regimes, namely open access, state property regimes, common property regimes and private property regimes. Case studies from various fishing nations are provided to illustrate these concepts and to put South African fisheries management into an international perspective. This includes a brief discussion on vertical integration and direct revenue collection instruments. The point is to show that fisheries management in South Africa has followed a general trend but has also evolved some very unique aspects. Also the micro to small vessel fisheries, medium vessel fisheries and large vessel fisheries have distinctive aspects that should be dealt with in specific ways.

Focusing on the 200 nautical mile EEZ, the state essentially has: i) custodianship over all marine living resources, ii) the power to control exploitation, iii) the power to distribute individual fishing rights, iv) the power to devise the rights and duties of individual fishers and v) the power to enforce its rules. The challenge facing the state

is to create exclusion criteria, distribute fishing rights fairly and to structure them in such a way that the gains from private ownership are realized within an environmental constraint. The aim of chapter 4 is to provide some detail on the distributional issues and the important rules defining individual fishing rights.

Within chapter 4, the forms of fishing rights, or the biological exclusion regulations, are first arranged according to an operational system. Second, a discussion is presented on the most important operational rules that governments have at their disposal in TAC fisheries when designing individual fishing rights. Third, it is proposed that rules available to the state for a TAC fishery, and within a distribution strategy, comprise a set of feasible options, or a structure of individual fishing rights. These rules create, to a large extent, the patterns of private incentives in the system and will determine the efficiency of the fisheries management plan. Finally, the South African case is analysed in terms of the operational rules the country has adopted for individual fishing rights. In other words, the chapter deals with how the design of individual fishing rights in the South African TAC fisheries impacts on the flexibility of the system, the incentives facing private fishing companies and fishers, the efficiency of the fisheries management plan and the effect it has on a redistribution strategy.

The purpose of chapter 4 is to prove finally that South Africa has evolved an extremely flexible system favourable to monopsonistic industrial organisation, which in turn makes the informational costs of the fishing management plan low. However, by adding a redistribution constraint, this structure of the individual user rights has a number of important effects: i) the information costs of the fisheries management plan increase substantially as new quota holders are added, which could lead to organisational failure, ii) the transaction costs to private fishing companies are increased and iii) it results in a weak redistribution, that is, only the resource rent is distributed which may or may not result in a redistribution of fishing capital and fishing skills.

Chapters 5, 6 and 7 examine in more detail the micro to small vessel fisheries, the medium vessel fisheries and the large vessel fisheries respectively. The major aims are to provide relevant information, with as much detail as possible on the fisheries in

each group, and to determine, within the available data, the effect that a weak redistribution policy (redistribution of the resource rent), could have on strong redistribution (redistribution of fishing capital and skills). Each fishery is accordingly described in terms of the following:

a An overview of the fishery. In the micro to small vessel fisheries both have a recreational and subsistence component, as well as illegal ones. These are briefly discussed. Details are provided on demarcated fishing zones and various other facts that characterize the fishery.

b A time series of the structure of the fishing fleet for each fishery. This gives an indication of the kind of access rights (not quota shares) and thus also the fishing capital available in each fishery.

c Access right distribution patterns are examined within the three different quota share redistributing institutions discussed in chapter two, namely the Quota Board, the Interim Quota Board and the Marine Living Resources Act of 1998.

d The skills distribution is examined using survey data from the year 2000. Here the racial distribution is measured using a demographically adjusted proportion of black skilled fishers weighted by a racial income differential.

e The quota share distribution, being the major instrument used by the South African fisheries authority to achieve redistribution, is again viewed across the three redistribution institutions.

f Both market power and control characterize the South African fishing industry. The concentration of access rights and quota shares is examined within the context of the individual company and the consolidated company (a derived structure of South Africa's consolidated fishing companies is presented in appendix A3), vessel ownership and quota share holdings.

Each chapter concludes by comparing the various fisheries in each group with particular emphasis on concentration and control (distributional trends) and strong and weak redistribution. The purpose is to provide evidence to back up the statement that the structure of individual fishing rights in South Africa works against strong redistribution and in favour of fishing industry concentration and control.

Finally in chapter 8, conclusions are drawn in terms of understanding, within an historical framework and a system of individual fishing rights, why MCM experienced organisational failure and how it dealt with this problem. Fundamentally,

the structure of individual fishing rights, which evolved in response to a monopsonistic industrial organisation during the apartheid era in South Africa, has re-emerged as MCM's current policy. This policy works against equity and redistribution. Also, different fisheries face different constraints and these should in certain instances be treated separately. The thesis ends with an opinion on fisheries management policy.

1.4 CONCLUSION

The classification of the important commercial fisheries provides a good starting framework from which to apply an economic logic to fisheries management and the distribution issues facing South African fisheries today. The three vessel length groups, namely micro to small, medium and large are analysed according to the evolved structure of individual fishing rights and the fishery specific details. The thesis sets out to provide evidence that the South African structure of individual fishing rights works against the redistribution of fishing capital and in the long run (if the individual fishing rights are tradable) in favour of monopsonistic industrial organisation. In fact, current policy provides strong biases against fishers and micro, small and medium fishing enterprises. This is described next, in chapter two.

CHAPTER TWO
THE INSTITUTIONAL AND ORGANIZATIONAL EVOLUTION OF THE SOUTH AFRICAN TAC FISHERIES

2.1 INTRODUCTION

The purpose of this chapter is to place the South African TAC fisheries into an institutional and organizational context. Broadly, before 1977 when South Africa managed to enforce its exclusive economic zone (EEZ), limited access and quota restrictions were in place for the small fishing vessel fisheries, namely, west coast rock lobster and abalone and anomalously the pelagic medium fishing vessel fishery. After 1977, most fisheries quickly became regulated. From the 1980s onward, the quota management systems for the TAC fisheries were concerned mainly with the structure and distribution of individual fishing rights. With a focus exclusively on the TAC fisheries, three time period are identified (adapted from Bross, 2001:1) as important: i) an era up until 1977 of open access in the medium and large vessel fisheries and open access and restrictions on the small vessel fisheries, ii) the 20 year periods between 1978 and 1997 where quota management systems in response to the 200 nautical mile EEZ were being established for all TAC fisheries and iii) the period from 1998 to the present which is marked predominantly by issues of redistribution and a new Act.

First, to put the discussion into a broad temporal perspective, all the major TAC fisheries were in existence before South Africa managed to enforce its 200 nautical mile fisheries EEZ during 1977. From a commercial point of view, the small vessel west coast rock lobster fishery developed first during 1895 (RSA, 1986a:31), followed by the large vessel deepsea hake trawl fishery in 1904 (Bross, 1999:3). The medium vessel inshore trawl (Hecht & Bross, 2001:49) and pelagic fisheries started during the late 1930s and 1940s (Heinecken, 2001:3) respectively. The micro vessel abalone fishery followed in 1949 (Pulfrich, 2001:2). The large vessel south coast rock lobster fishery began during 1974 (Japp & Groeneveld, 2001:2). The medium-vessel-sized hake long-line fishery was introduced as a commercial fishery during 1994, but only became commercially viable in 2000 (Hecht & Bross, 2001:104).

2.2 THE EARLY PERIOD: BEFORE 1977

2.2.1 Introduction

During the period before the South African EEZ was recognized (1977), six of the seven TAC fisheries started, three important fishery laws were passed, the central authority evolved and two advisory bodies were established. Regulations and control of the small vessel fisheries, namely west coast rock lobster and abalone, were also developed. Although the medium vessel pelagic fishery anomalously established a TAC, the other medium and large vessel fisheries remained unregulated. This was mainly due to the fact that they fished in international waters outside of the three, five and then 12 nautical mile territorial water zone. Quota management systems only began in earnest after 1977.

2.2.2 Laws, State Authorities and Advisory bodies

Before the independence of South Africa from Britain in 1934, the fishing authority was the Sea Fisheries Research Institute. During 1929, the Department of Mines and Industry created a Division of Sea Fisheries and the Fisheries Research Institute became an advisory body, and remained so until 1998. At some stage in 1930, the Hague Conference resulted in the creation of a three nautical mile territorial waters zone for coastal states giving the fisheries authority the right to essentially manage their micro to small vessel fisheries and to exclude foreign vessels from exploiting the resource (RSA, 1986a).

Six years after South Africa's independence from Britain, the Sea Fisheries Act of 1940 was passed, which gave sole powers to central government to administer the fishing industry and was according to van Sittert (2002:296) the start of the first fisheries reform process in South Africa. The Fishing Industry Development Bill of 1943 attempted unsuccessfully to create a marketing board for the medium vessel inshore trawl and large vessel deepsea hake trawl fisheries[1] (van Sittert, 2002:296). Van Sittert (2002:297) further contends that the primary target was the monopsonistic and monopolistic fishing firm Irvin & Johnson (I&J). The passing of the Fishing Industry Development Act of 1944 established the Fishing Development Corporation

[1] A state controlled monopoly on the marketing of hake and hake products.

of South Africa Limited. The object was to promote and develop the fishing industry by providing credit for individual fishermen and the creation and maintenance of coastal fishing structures, most notably fishing harbours. In other words, although a Marketing Board was proposed with the purpose of controlling the hake fisheries for the Afrikaner welfare state, "...English monopoly capital, not Afrikaners capital" (van Sittert, 2002: 295 & 297) won the day.

Six years after the National Party took control of South Africa—often marked as the beginning of official apartheid policies—the Chief Directorate: Marine Development replaced the Division of Sea Fisheries (1954) and a new advisory body called the Sea Fisheries Advisory Council was initiated. The Sea Fisheries Research Institute still provided biological and conservation advice. At about this time the first debate on fisheries policy started in the international arena with the publication of Gordon's (1954) paper, *The Economic Theory of The Common Property Resource: The Fishery.*

Bross (2002: 39) reports that between 1960 and 1977 the entry of foreign vessels escalated particularly in the large vessel deepsea hake trawl fishery. Starting in 1958, the 2nd United Nations Conference of the Law of the Sea culminated in extending coastal state territorial waters to 12 nautical miles. In response, the National Party Government passed the Territorial Waters Act of 1963 defining their territorial waters as 12 nautical miles from the shore but also making provision for a 200 nautical mile fishing zone to protect the large vessel fisheries. However, the 3rd United Nations Conference on the Law of the Sea only started during 1972. Thus by international convention, and the questioned legitimacy of the apartheid government, the South African 200 nautical mile fishing zone declaration was ignored by foreign fleets until 1977, which was a year after the United States of America declared their EEZ.

2.2.3 Micro to Small Vessel fisheries

As is outlined above, the micro to small vessel fisheries that were established during this time are the west coast rock lobster (crawfish) and the abalone fisheries. The story of the small vessel fisheries during this early period is largely one of addressing excessive fishing mortality by restricting catch sizes, imposing closed seasons, establishing sanctuaries and allocating export, production and marketing quotas (RSA, 1986a). In both fisheries, problems of compliance with regulations and

policing started almost immediately after regulations and restrictions were implemented.

Although fishing occurred previously along the South African coastline, it is generally accepted that the commercialization of the fisheries started in 1897 when John X Merriman and Charles Manuel started canning west coast rock lobster (then called crawfish[2]) for export (RSA, 1986a:31). The west coast rock lobster fishery was first regulated on 1 October 1895 by proclaiming a closed season between the middle of October to the beginning of February and limiting the catch size to a carapace of greater than three inches. West coast rock lobsters in berry (carrying eggs) were also protected in the proclamation. Shortly after the protective measures were introduced and fisheries inspectors employed, difficulties in policing and compliance were reported (RSA, 1986:31), a problem still experienced today. The first west coast rock lobster sanctuary was introduced in 1918. The practice of creating west coast rock lobster sanctuaries continued and expanded after the Department of Mines and Industry established the Division of Sea Fisheries in 1940.

Ostensibly under the banner of poor quality control, particularly for export, the Crawfish Export Act of 1940 was passed which gave the Minister of Commerce powers to prescribe quality, methods of packing and examination. Also, no west coast rock lobster could be exported without a permit or approval from the government inspector. In 1946, the Division of Sea Fisheries attempted to further restrict catch in the fishery by imposing an export quota—the first instance of quota management in South Africa. The Diemont Commission (RSA, 1986:32) reports dissatisfaction during this allocation period; government distributed to individual packing and canning companies the six million pound[3] (in tail mass) export quota. Additional marketing and production quotas were introduced during 1969 and 1970 respectively.

The abalone fishery started at Gansbaai in 1949 (Pulfrich, 2001:18). A size-limit restriction of four inches was introduced during 1953, and permits the following year.

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[2] Crawfish became officially known as west coast rock lobster in 1953 by an amendment to the Crawfish Export Act 1940.
[3] About 2700 metric tons.

These measures were used in an attempt to reduce excessive fishing mortality (RSA, 1986:43). Pulfrich (2001:18), however, reports that the licences to commercially harvest abalone were freely available; the number of licensed divers increased to 104 by 1964. Abalone exploitation peaked in 1965 and subsequent declining catches resulted in first production quotas for the 1968 season. The production quotas were distributed to the factories[4]. However, according to Pulfrich (2001:18) these quotas were not immediately filled and only served to limit catch for the first time in 1970.

2.2.4 Medium Vessel Fisheries

Small pelagic fish, namely, anchovy, pilchard and red-eye, are usually harvested within the 12 nautical mile zone, but may extend far beyond that. The South Africa pelagic fishery started in the late 1940s, the first fish-meal plant was in established in 1949 and harvest was restricted by quota and boat limitations in 1950. Heinecken (2001:3), however, asserts that no attempts were made to enforce the catch restrictions and up until 1974 no individual rights were allocated. He further states that after 1974 production limits were imposed on processing factories, but had no real effect in reducing the harvest. This is attributed to the fact that processing capacity was set abnormally high to allow optimum processing during the peak period. Private boat owners[5], who did not receive individual quota shares, were paid on a negotiated formula for a "raw fish price", that is, they harvested the pelagic species for the monopsonistic processing factories. Essentially, during this period catch limitations were supposedly instituted by an attempt at restricting the canning and fish-meal processing capacity rather than applying direct harvest quotas.

Hecht & Bross (2002:49) report the early history, before the institution of the 200 nautical mile EEZ, of the inshore fishery as follows. From its inception in 1939, medium Irvin & Johnson company trawlers exploited both shallow water hake (*merluccius capanesis*) and Agulhas sole (*austoglossus pectoralis*) from East London,

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[4] This essentially established a monopsonistic market structure where the processing factories controlled the price of the raw product, namely, abalone. The west coast rock lobster export controls (including an export quota) must have had a similar effect.

[5] Heinecken's (2002) private boat owners are those fishers who operated, and still operate in some instances, without a quota share. The restrictions determined what organisations could process and market fish—essentially creating a space for state awarded monopsony, perhaps in response to the monopsonistic and monopolistic market structure created by English capital in the hake fisheries.

Port Elizabeth and Mossel Bay. By 1950 individual boat owners[6] entered the fishery and began to trawl mainly for sole. Like the deep-sea trawl fisheries, up until 1978, the inshore trawl fishery was unregulated and controlled by English monopoly and monopsonistic capital.

2.2.5 Large Vessel Fisheries

The deep sea trawling fishery, targeting mainly deep-sea hake (*merluccius paradoxus*), was started by Irvin and Johnson in 1904 (Bross, 1999:2). Bross (1999) describes the history of the deep-sea hake trawl fishery as follows. The period 1904 to 1960 was characterized by the opening up of domestic markets largely to supply the mines. He contends that it was not English monopoly capital that led to a monopoly market structure, but rather exploitation was restricted by high risk (seagoing operations), large capital requirements (large to very large vessel fishery) and a focus on product distribution. These factors led to a consolidated and vertically integrated monopolistic and monopsonistic industrial organization by the end of the 1950s.

After 1960, the influx of foreign vessels exploiting South African stocks meant that "[t]he domestic industry was destabilised to the point where its continued existence was brought into question." (Bross, 1999:6). According to Bross (1999:11) this state of affairs led the Department of Trade and Industry to appoint a Committee of Enquiry during 1975. The Committee drew three important conclusions: i) that local fishing (at least medium to large vessel fisheries) was doomed unless foreign fishing vessels could be kept out, ii) that proper regulations (quotas) should be introduced and iii) that old vessels should be replaced. The South Africa 200 nautical mile EEZ was, however, only recognized two years later, that is, in 1977. Following this, quota management systems were introduced and subsequently developed. The average age in 2001 of the deepsea hake trawl fleet was 25 years (Warman, 2002:329-331), either a lingering concern or a result of the quasi rents accruing to fishing specific assets coupled with the purchase of cheap, but old, previously subsidized fishing vessels from developed fishing nations.

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[6] That is, individuals and companies who were not part of Irvin &Johnson fishing company.

After 10 years of unsuccessful attempts to commercialize the south coast rock lobster fishery, it was finally established in 1974 when traps were used as a method of capture (RSA, 1986a:33). Both foreign and local vessels exploited the resource using large vessels and remained unregulated until the 1985/86 fishing season. The development of the quota management system for the south coast rock lobster fishery is covered in section 2.5.

2.2.6 Conclusions

In the case of the small vessel fisheries, west coast rock lobster and abalone, prices have remained high, access is relatively easy and policing is difficult. Restricting formal entry into the fishery by awarding rights to the most capital-intensive operation, namely the export marketing and processing side, to in effect outlaw Black operators as poachers would coincide with apartheid policies. Although never explicitly stated, the legitimization of these 'poachers' is an important aim of the Marine Living Resources Act of 1998.

Although this cannot be proved, there is a suspicion that the pelagic fishery was also manipulated by the apartheid state. Afrikaans economic empowerment initiatives could quickly, and with the least amount of risk, be achieved in the pelagic fishery through a white dominated monopsonistic market structure coupled with a monopolistic distribution structure. Extending credit and distributing fishing rights to select processing companies, rather than the smaller fishing vessel units, seems to have been a likely strategy.

Before the recognition of South Africa's EEZ in 1978 and before the influx of foreign vessels, external factors such as the high risk (seagoing operations), large capital requirements both in fishing and processing and a focus on product distribution would effectively limit harvest in the very large vessel deep-sea hake trawl fishery (Bross, 1999). This argument provides a good case for the vertical integration and monopolization by English capital in both the deep-sea and the inshore hake trawl fisheries. Natural barriers to entry (large capital outlays) and the dominance of English interests in these fisheries effectively diverted the efforts of the state to impose any form of market control.

Generally, before international recognition of South Africa's EEZ in 1978, the practice of restricting catch by regulating the capacity of processing and marketing companies seems to have been the favoured fisheries management style established during the apartheid era in South Africa. White interests could more easily be controlled and entrenched by targeting the more capital intensive, and generally monopsonistic, side of fishing operations. The next stage in the development of fisheries management in South Africa was the design and implementation of quota management systems for the TAC fisheries.

2.3 DEVELOPMENT OF QUOTA MANAGEMENT SYSTEMS: 1978—1990

2.3.1 Introduction

On 1 November 1977, international recognition of South Africa's EEZ gave the state "...the authority to lay down a TAC for each species" (FIHB,1991:68) and to manage its fisheries accordingly. In other words, the first step to enable quota management systems was created; many countries also adopted these systems in the early 1980s (see chapters 3 and 4) and South Africa followed suit. The overcapacity problems (discussed in more detail in chapter 3) faced by many countries arising from the recall of their vessels to home waters did not affect the South African fisheries. However, part of the convention stipulated that "...if fishing craft belonging to or under the control of the coastal state are not able to harvest their catch, then there is an obligation to allow foreign flag ships to harvest any surplus." (Stuttaford,1991:68). South African fisheries at that stage had the capacity to harvest at Maximum Sustainable Yield, at least in the deepsea hake trawl fishery (Bross, 1999:8). During the next seven years, in time for the 1984/85 fishing season, simple quota management systems were developed and implemented in all six South Africa TAC fisheries.

The quota management systems in those fisheries that had existing catch and gear regulations, prior to 1977, developed at a different pace from those that did not, however, the general aspects and traits of each system turned out to be similar. The development of the quota management systems until 1990 is examined in the sections below. To start with, the common denominator to all fisheries was the Minister's power to set the TAC—on the advice of the Sea Fisheries Advisory Board, the Sea

Fisheries Research Institute and the Chief Directorate: Marine Development—and to distribute quota shares or other fishing rights to individuals (legal personae or otherwise). Also, starting in 1985, the Minister of Environmental Affairs took it upon himself to broaden the distribution of quota shares in the South African fishing industry.

2.3.2 Micro to Small Vessel Fisheries

The first west coast rock lobster TAC was introduced during the 1979/80 fishing season. Individual quota rights were first allocated on a historical basis, that is, on the grounds of a previous catch record—most fishing countries used this method as an initial distribution mechanism (see chapter 3). The result in South Africa was that processing and marketing companies controlled the bulk of the TAC. Conflict arose between the historic production and marketing quota holders, small vessel owners and coastal communities, in particular the fishers on the west coast of the Cape Province. During 1983 abalone was subject to its first TAC, but also had a dual individual fishing rights system. The divers, who are the actual fishers, up until 1983 only held rights to catch and deliver to the processing and marketing companies. However, during the 1983/84 season, 50% of the TAC was distributed to the divers.

2.4.3 Medium to Large Vessel Fisheries

The deep sea hake trawl and the inshore fisheries got off to a bad start in 1978 when a TAC was determined; quota shares were not distributed to individual companies. The result was a race to catch, but only until the TAC was reached. As is outlined in chapter 3, this leads to fishing over-capacity problems and the associated allocative inefficiencies, simply because the more powerful and technologically advanced the vessel, the quicker it can harvest the resource. However, for the 1979 fishing season, the members of the fishery were asked by the Chief Director of Marine Development to negotiate among themselves to establish an initial distribution of the TAC (Bross, 1999:8). The large majority of the TAC was divided on a negotiated basis between the three large vertically integrated companies[7] (Bross, 1999:8) and three smaller companies. A group of non-vessel-owning small processing companies were,

[7] The shares were as follows: Irvin and Johnson 45.8% of TAC, Sea Harvest 35.4% of TAC and Atlantic trawling 10.7% of TAC (RSA, 1996a).

however, concerned about the supply of their raw fish inputs. Quota shares were awarded to this group[8] with the understanding that the large companies would do the harvesting. A small proportion of the TAC for hake, linked to sole, was distributed to the inshore trawling companies again dominated by Irvin & Johnson and Sea Harvest fishing companies.

Problems arose again in 1985 when the Minister of Environmental Affairs (Mr. Wiley) decided to introduce additional quota holders on the basis of what was called the 80:20 rule. The 80:20 rule, according to Bross (1999:16) "...was the so-called agreement, devised to allow new entrants into the fishery at a moderately controlled rate. It stipulated that, until such time as the TAC regained its earlier maximum, 80% of any increase would be proportionately subdivided between the 1985 quota holders and 20% would be at the disposal of the Minister".

This concept, although devised to increase the number of participants, particularly in the highly concentrated deep-sea hake trawl fishery, is fundamentally flawed. When the environment provides favourable conditions for the growth of fish stocks, the number of individual quota holders can be increased to the benefit of all. However, when unfavourable environmental conditions occur it is very difficult to remove quota holders from the pool. This kind of non-proportional division of the TAC, albeit at a 20% of surplus level in the South African case, generated similar problems in the New Zealand fisheries where it resulted in a "[b]reakdown in [the] working relationship between government and industry." Kidd (2000:136). Kidd was the Minister of Fisheries for New Zealand between 1990 and 1996 and his stated mandate was "...to get fisheries management out of the courts" (Kidd; 2000, 137), a problem he attributes to the reneging by the previous government of an 'acceptance' clause in the new fishery act: when the TAC declines, government compensates fishers for their reduction, and when the TAC rises fishers pay for the additional TAC.

In the case of the south coast rock lobster fishery, by 1980 harvest was restricted by the use of individual access rights attached to vessels without withdrawal restrictions. However, prior to the 1984/85 season the Chief Director of Marine Development

[8] The group formed an association called the Independent Fish Processors' Association.

instructed the participants in the fishery to negotiate a division of a forthcoming TAC. The industry could not agree on criteria and submitted two options to the Chief Director. An initial distribution based on historic catch records was chosen (RSA, 1986a: 34). The 1984/85 TAC was subsequently divided into quota shares and distributed between six fishing companies.

In the pelagic fishery, the original distribution of individual fishing rights to processing companies and some independent fishing vessel owners—with vessel limitations—continued until the 1983 season. A decision was reached during 1984 that canning of pilchard should be encouraged to provide cheap protein for low-income households. The pelagic TAC was split between a pilchard TAC and an anchovy TAC; the remaining species were not subject to a TAC. Again the members of the fishery were requested to negotiate an initial distribution of the TAC between themselves. This led to problems and negotiations broke down, resulting in an ad hoc allocation by the Minister in 1986: about 23.5% of the total TAC went to independent vessel owners. An interesting division of rights between vessel owners and processing companies had developed. Previously, independent vessel owners only had rights to catch and deliver raw fish to a licensed quota-holding processing company (RSA, 1986a:27). One of the tasks of the Diemont Commission was to distribute the split quota—between pilchard and anchovy—among the various interest groups.

2.3.4 Conclusions

The initial development of quota management systems and individual quota distributions during the period 1978 to 1990 follows a number of like criteria.

a With the imposition of a TAC and an individual quota distribution system all the fisheries were asked to negotiate between themselves to determine the initial distribution shares. This meant that the fisheries were considered closed to *new entrants* and outside operators.

b In all six TAC fisheries, power developed in the hands of the non-fishing operators who relied exclusively on raw fish inputs for their processing and marketing companies. The initial distribution of quota shares based on historic involvement served to entrench monopsonistic power, vertical integration and oligopolistic industrial structure in all the TAC fisheries.

c Based on the above historical factors, a dual system of individual quota shares usually developed, but with the balance of power still in the hands of the packing, processing and marketing companies.

d In the period 1985 to 1989, the quota management systems and distribution shares left the industrial structure relatively unchanged. However, some redistribution to new quota holders occurred.

During 1986, the Minister of Environmental Affairs embarked on a project to broaden access to the South African fishing resources, which affected all historic participants. This move led to the establishment of the Diemont Commission. The next section deals in some detail with the Diemont Commission.

2.4 THE DIEMONT COMMISSION: 1986

2.4.1 Introduction

On 7 June 1985, the Diemont Commission was tasked to inquire into the issues that emerged as a result of the initial design of quota management systems, the distribution of individual quota shares, and the body tasked with the distribution of the quota shares and after to recommend any alterations to the existing institutional structures (RSA, 1986a:i&ii). Many of the issues the Commission was tasked with still remain contentious today. These points are highlighted later in the chapter.

2.4.2 Ownership and Control

The commission first dealt with the issues of the ownership and control of marine living resources. Essentially it found that according to Roman Dutch law, the sea and its resources are *res extra commercium* (RSA, 1986a:1), meaning that they cannot be subject to ownership. The commission did agree that these resources and their use can, and should, be subject to control and regulation, but had to be "...consistent with the protection of the resource, [and] the fishery should be exploited to the maximum possible extent[9]...for the benefit of all people" (RSA, 1986:3). In other words, although the state has custodianship of all marine living resources, it should ensure maximum economic benefit primarily through its quota share distribution policy.

[9] A similar optimisation type statement in the Magnuson Steven Act in the USA gave the economists a 'foot in the door' into fisheries policy where it was previously at the behest of biological scientists—a situation still prevalent in South Africa today.

Bioeconomic studies (see chapter 3) had not been conducted in any of the South African fisheries so it is assumed that the Commission meant that the living marine resources be exploited at the maximum sustainable yield articulated in a TAC or TAE.

The Commission recommended that the regulations should be kept as simple as is possible and that certain norms be recognized and strictly adhered to by the administrative and/or quota share distributing authority. The stated norms are:

(a) "The rules should be stated clearly and unambiguously.
(b) The rules should be applied fairly and equitably.
(c) The rules should be applied consistently.
(d) The rules should not be applied arbitrarily.
(e) When decisions are made full disclosure should be made to all interested parties." (RSA, 1986a:3)

Although these points are fairly obvious, those involved in the fishing industry perceived that the distribution of individual quota shares was ad hoc as well as being arbitrarily devised and applied—an identical sentiment has persisted up until 2001 (covered in section 2.10).

2.4.3 The Quota Distribution System

One of the most important issues that the Commission dealt with was the method of dividing the TAC into individual quota shares—the quota distribution system. Primarily, it defined quota in terms of asset sizes[10] as the "...amount of fish species which a company or individual would be permitted to catch in a prescribed period" (RSA, 1986:2) and as a consequence adopted and recommended a fixed quota distribution system. In a TAC fishery under a fixed quota distribution system, companies or individuals are awarded a right to an absolute amount of a fish species from year to year. Alternatively, with a proportional quota distribution system, the companies or individuals are given rights to a certain percentage of the TAC. The important difference is that a proportional quota is indexed on a year-by-year basis to the TAC, but a fixed quota is not.

[10] The details of the asset size operational rule are discussed in chapter 4.

By adopting a fixed quota distribution system, the Commission in effect gave legitimacy to the 80:20 rule discussed previously. Basically this meant that existing fishing companies could not proportionally increase their harvest during good fishing years reflected in a higher TAC. In line with Minister Wiley's policy, 20% of the additional harvest allowed by a larger TAC, or environmental windfall gain, could during good years be distributed to 'new quota holders'. The problem comes, for example, when bad years are followed by good years—a fluctuating TAC. If, for example, all firms take a proportional drop in their fixed quota during a bad year and additional 'new entrants' are introduced during good years, the absolute share of the TAC per fishing company will consistently fall while the number of participants will constantly increase. For obvious reasons, fixed quota distribution systems were not widely accepted, or used, in fisheries outside of South Africa.

Surprisingly, the Commission also recommended that other forms of 'superfluous' regulation, specifically limitations on the number of factories and factory capacity, should be phased out (RSA, 1986a:3,70). In effect a large majority of individual fishing rights had in the past been allocated to factories (packing, processing and marketing) as input security (monopsonistic market structure), and perhaps as a barrier to entry to poorer communities and those which were discriminated against. The Commission took a non-interventionist stance, suggesting by implication that efficiency in the processing and marketing fish products is better achieved through the discipline of the market. This recommendation of the Commission was ignored and the interventionist practice of licensing fish processing establishments is still in place[11].

2.4.4 The Right of Participation

Paragraphs (1) and (2) of the terms of reference deal with questions of right of participation[12] and whether the distribution of individual rights on the basis of past performance is fair, that is, whether the fishery in question should be closed to 'new quota holders' or not? That is, does i) "the practice whereby the Minister of Environmental Affairs and Tourism annually allocates quotas to existing quota

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[11] This is reminiscent of the royal monopoly right and the term royalties.
[12] The 'right of participation' operational rule is dealt with more formally in chapter 4.

holders mainly according to past performance; [and] ii) the desirability...[of] manage[ing] the Fishing Industry as a closed Industry;" (RSA, 1986a:i) result in a fair distribution mechanism?

Primarily, the commission noted that the yearly task of distributing individual quotas places a heavy burden on the Minister subjecting him/her to political pressures that are not strictly relevant to the promotion of the fishing industry. It recommended that the practice where "...the Minister...after consultations, determine[s] the TAC...is right in principle...[but it is]...not right in principle that the Minister should be called upon to determine individual quotas." (RSA, 1986a:4). In other words, the task of distributing and redistributing quota shares should be taken out of the political arena.

The Commission also noted, that it was faulty to accept that only initial participants, based on past catch or processing performance, have exclusive rights (RSA, 1986a:6). On the one hand, existing companies from the medium and large vessel fisheries argued that the fisheries were fully subscribed and should be managed as closed to any *new quota holders*. This was largely based along the lines of natural barriers to entry. They, however, also pointed out that most of the larger fishing companies were registered with the Johannesburg Stock Exchange and anyone could, in effect, enter the fishery by buying shares.

On the other hand, smaller companies and independent fishing vessel owners argued that more room should be given to the fishers, particularly in the small vessel fisheries, to hold quota shares. Their argument was based on the principle that those who do the fishing should be given the rights to fish and that broadening access to the fishery was simply a corrective redistribution mechanism from the *sea lords* to the fishers.

The Commission (1986a:6) concluded that the fisheries were not closed because i) to be consistent with the ownership criteria (*res extra commercium*), as far as is possible, the sea and its resources should be kept open to new fishermen and ii) people could enter most fisheries by buying shares in listed fishing companies or the Minister may redistribute quota to a 'new quota holder' when the need might arise to cancel an existing right.

2.4.5 Tradability and Term of Quota Shares

The Commission also dealt with issues regarding the tradability and term of quota shares. Paragraph (3), sections (c), (e) and (g) in the terms of reference (RSA, 1986a:2) instructed the Commission to deal with quota as follows:

(3) "the basis on which quotas should be allocated with special mentioning of—

(c) the desirability to guarantee quotas for a specific period;

(e) the transferability of quotas;

(g) the vesting of existing quotas concessions on a permanent basis;" (RSA, 1986a:10).

Sections (c) and (g) essentially deal with length of tenure of the quota shares. Dealing with point (g) first, the Commission (1986a:10) was very clear that a permanent (inheritable) individual fishing right implied ownership and was adamant that this was contrary to the *res communes* in Roman Dutch law (discussed in section 8.5.1) and that it would be unwise for Parliament to change the common law.

The practice of allocating the quota shares on a year-by-year basis as opposed to longer terms was debated. The commission (1986a:8) found that the annual basis of renewal or redistribution of quota shares, particularly in the medium to large vessel fisheries, was contrary to economic viability. Their reasoning was that with large capital outlays, a long time was needed to recover the initial investment and secure a reasonable return to capital and this required a longer term than a single year. In accordance the Commission recommended a longer term for the larger vessel fisheries. This recommendation seems to make sense on one level, but would be difficult to implement with an annually established TAC coupled with a fixed quota distribution system. The allocation of quota shares accordingly remained an annual event until 2001—quotas were allocated for a four-year period, based on a proportional quota distribution system.

Because fishing companies could be freely traded, in the open market or in the stock exchange, the Commission correctly viewed that quotas were in fact tradable even if no provisions had been made in the Sea Fisheries Act. In this respect it made a number of recommendations (RSA, 1986a:9), the important ones being that i) a quota share must be held for a minimum period of three years before it can be traded, ii) a

quota must be linked to a productive asset such as a fishing vessel or a processing factory (the right of participation operational rule), so that it does not become a paper quota[13], iii) the transferee must be a South African citizen and iv) that person or legal persona or otherwise may accumulate no more than 30% of the TAC. Finally, the details of all allocations and transfers must be kept in a register.

Because the Commission recommended that quotas be transferable subject to certain restrictions, they saw no objection to section (f) of paragraph 3, namely, that "...the admission of new entrants [quota holders] into the Industry" (RSA, 1986a:i) cannot be stopped particularly if they buy quotas from existing quota holders. Apart from taking advantage of the 80:20 rule, the Commission, however, saw little opportunity for allocations to new quota holders given that all fisheries were fully subscribed. Basically, if a person wants to join a fishery s/he has to either i) buy their way in by purchasing shares in the fishing company or ii) secure an allocation out of the 20% of any increases in the TAC. From there the person can buy up more quota, allowing them to withdraw more of the resource, but only up until they own just less than 30% of the TAC.

2.4.6 Dealing with the Racial Distribution

In terms of paragraph 4 "[T]he degree to which the different population groups in the existing and/or recommended dispensation should be allowed as entrepreneurs in the Industry," (RSA, 1986a:i), the Commission showed concern for the fishers along the west coast harvesting west coast rock lobster. In particular, and because the fishers were seen as individual fishing units, minimum asset quota sizes were important (RSA, 1986a:81)[14]. The Commission (1986a:79) reports that in 1981 when Dromadaris Visserye (Ltd) became a public company, 50% of the shares were allocated to individual fishermen. Later during 1982, after the company became part of the Small Business Development Corporation, the remaining 50% was allocated to the fishers. The quota share to the company was distributed among the 187 licensed

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[13] Paper quotas are individual fishing rights held for speculative or rent seeking purposes. Alternatively, paper quotas can exist if individuals are awarded a quota share that is too small to be economically viable (see section on dealing with the racial distribution of quota shares).

[14] This was in particular reference to the Dromedaris Visserye (Pty) Ltd founded in 1976 and incorporated as a wholly owned subsidiary of the Coloured Development Corporation established to protect the interests of individual coloured (mixed origin) fishers.

west coast rock lobster fishers who agreed to sell their catch to the company. The asset sizes of the quota shares, however, were not equal. Some fishers held quota shares that were not economically viable. Accordingly the Commission recommended an increased proportion of the TAC for the company and larger asset sizes for the fishers—a recommendation rejected by the Government (RSA, 1986b:26). Apart from this particular case, nothing was noted on broadening access in the other fisheries to people of mixed or African origin.

2.4.7 Leases, Levies and Revenue

Importantly, the Commission (1986a:8) pointed out that quota holders also have certain duties. Because quota holders in effect held rights on lease from the government, the Commission recommended that a rent be paid as a levy on landed catch. Even though the Commission was aware of other countries realizing and collecting the value of the right directly, the "...payment of money for quotas" (RSA, 1986a:6) was strongly discouraged on the basis of uncertainty and a lack of markets for quota shares (not readily tradable). Money collected from levies on landed catch was to be deposited into the Sea Fisheries Research Fund. This fund was used exclusively to finance biological and oceanographic research in South Africa. Central government transfers financed the balance of the fisheries management costs.

2.4.8 Conclusions

The main reason for the Commission was to assess the practice of the Minister of Environmental Affairs and Tourism in allocating a portion of the TAC based on the 80:20 rule to new quota holders. In this regard, perhaps the most visible outcome was the removal of the powers of the Minister to determine the distribution of quota shares. This function was delegated to an independent Quota Board later established in the Sea Fisheries Amendment Act of 1988 and instituted in 1990.

It was agreed in principle by the Government in the White paper (RSA, 1986b:7) that the fisheries should not be managed as closed. This was because individual quota shares were in fact tradable and the anticipated Quota Board should still apply the 80:20 rule—in a fixed quota distribution system. To counter the ratchet effects of a fixed quota distribution system, the Government stipulated that in the event of a fall in TAC, no new quota holders would be added until all the previous quota holders had

recovered their original fixed share. This means that quota shares were fixed upwards when the TAC increased and would decline proportionally when the TAC fell.

In addition, a smaller advisory body, with subcommittees for each fishery, was proposed to assist the minister in setting the TAC for each fishery. Accordingly, the Fisheries Advisory Committee replaced the Fisheries Advisory Council. Both commercial and recreational representative interest groups (industries' bodies) were given statutory recognition with powers to advise the Fisheries Advisory Committee on their particular fishery. The Minister would also be responsible for allocating quota shares to foreign fishing concerns. These institutions were enacted in the Sea Fisheries Act of 1988.

The Commission did not explicitly deal with the practice of allocating individual quota shares to fish processing establishments, but it did state that these activities and in particular factory capacity should be allowed to function according to the free market. Limiting factory capacity, however, was accepted in principle in the White Paper (RSA, 1986b:6)—the mandatory licensing of all fish factories still remains today. In some respects this has merit from a policing point of view; controlling both the harvest and regulating the allowable raw fish inputs into the secondary processes, by limiting the number of factories, is a double check to ensure compliance with catch restrictions, but it is definitely not in the spirit of deregulation (see section 2.10).

To improve security of tenure and to make economic sense, mainly in terms of providing a long enough time period for a reasonable return on capital, it was recommended and accepted that individual quota shares be allocated on the merits of capital investment in each particular fishery (RSA, 1986b:10).

Minimum viable asset sizes were seen as relevant only in the individual fisher's case and linked to the racial distribution of quota shares in the west coast rock lobster fishery. The government response was simply that small non-viable quota will "improve income to fishers and provide them with a stake in the industry" (RSA, 1986b:16). This is contradictory in a general sense and typical of the racial decision-making in the apartheid state. Allocating non-viable quota shares to fishers of mixed origin effectively limits the ability of these fishers to establish an operative stake in

the fishery, but then again it is always easier to remove a non-operative right, or paper quota, than an operative one. This practice still remains today.

2.5 ORGANIZATIONAL CHANGE: 1987

According to Stuttaford (1991: 72), on 1 April 1987 the inspectorate of the Chief Directorate of Marine Development was devolved to the Chief Directorate: Nature and Environmental Conservation and was named the Fisheries Control Services. The Fisheries Control Services were mandated to run the inspection services (law enforcement and policing), patrol boats and island reserves. Also, on the same day, the planning, construction and maintenance of fishing harbours became the responsibility of the Chief Directorate of Works and Coastal Structures of the Cape Provincial Administration. In Natal, the Natal Parks Board and the Natal Provincial Administration became responsible for the Fisheries Control Services and the fishing harbours in Natal. In the same year, the Small Business Development Corporation took over the financing activities of the Fishing Development Corporation of South Africa.

The Chief Directorate of Marine Development was renamed as the Sea Fisheries Chief Directorate with a staff of 200 people. Its functions were to advise the Minister on policy and the formulation of laws and regulations covering all aspects of marine fisheries in South Africa. It was responsible for administering the Sea Fisheries Act of 1988, the Sea Birds and Seals Protection Act of 1973 and the Territorial Waters Act of 1973 (which covered the 200 nautical mile EEZ). The Sea Fisheries Research Institute remained independent of the Sea Fisheries Chief Directorate and had a staff of 150 scientists. It had a research emphasis and aimed to provide advice on the utilization of South Africa's living marine resources and the conservation of marine ecosystems, in particular the setting of a TAC (Stuttaford, 1991).

2.6 THE QUOTA BOARD: 1990—1998

The Quota Board was instated as a result of the recommendation of the Diemont Commission and was implemented fully on 1 July 1990 (Stuttaford, 1991) when the Sea Fisheries Act of 1988 (RSA, 1988:sections 15 to 24) came into effect. The Quota

Board sat for the first time on 12 October 1990. The two broad functions of the quota board were i) to recommend guidelines for the determination of the distribution of quota shares and ii) to allocate quota shares within certain guidelines and within the TAC in the various fisheries. The Act also stipulated that members of the board must have no direct or indirect interest in the fishing industry or be employees of the state and the chairperson should have a legal background. In addition, even though the Diemont Commission and the White Paper (RSA, 1986b:4) recommended that longer terms of tenure were desirable, the uncertainty of future political events meant that the Quota Board allocated individual quota shares on an annual basis.

The Fisheries Advisory Committee was also constituted to give advice to the Minister (and the Quota Board) on any matter prescribed in the Sea Fisheries Act of 1988. The Committee effectively replaced the 19 members of the Sea Fisheries Advisory Council with nine people who did not formally represent any particular fishery. Further, in terms of section 13 of the Sea Fisheries Act of 1988, fishing industry bodies and other groups could be formally recognized and had powers, in terms of section 14 of the Sea Fisheries Act, to furnish information and provide advice to the Sea Fisheries Advisory Committee and the Sea Fisheries Chief Directorate (RSA, 1988). The aim of this advisory arrangement was to improve cooperation between the private sector and the state by promoting co-responsibility for fisheries management.

During 1992 the Sea Fisheries Amendment Act (RSA, 1992) increased the powers of the Quota Board to authorize quota share transfers and the issuing of quota shares distributed by the Minister. In liaison with the industry bodies, a set of guidelines establishing the allocation rules to direct the distribution of individual quota shares was drafted. Broadly the guidelines did a number of important things. First, the guidelines marked the South African fisheries for the benefit of South Africans. This was in line with the cancellation of almost all foreign fishing rights to South African waters, except a 1000 ton hake quota to Mozambique (Stuttaford, 1993:94). Second, this obviously meant that there was an additional amount of previously held foreign quota shares which could now be reallocated. In addition, the Board made it clear that underutilized quota shares, and also implicitly paper quotas, could be reallocated as well. In essence, the Quota Board was trying to create a space from which to

broaden access to the South African fisheries by allocating *surplus* quota to new entrants.

Third, the guidelines attempted to create a relatively loose link between quota holders and vessel or fish factory owners. The guidelines still, however, provided the ability of factories to hold rights without actually fishing. The implicit argument now seems to be that protecting the raw fish inputs for licensed factories ensures product enhancement and the welfare of surrounding communities. Fourth, the issue of minimum asset sizes was again raised but only in relation to small quota holders, and presumably new quota holders. The implicit statement here is that the larger quota holders, mainly vertically integrated corporate fishing companies, already held more than a sufficient portion of the TAC. Finally, the guidelines reemphasized the historic performance criterion for quota reallocations. This criterion was previously rejected by the Diemont Commission but accepted by the Government (RSA, 1986b:6).

During the following year, 1993, the guidelines were revised. To qualify for an individual quota share the guide previously stipulated that the individual must at least have the means to acquire a fishing vessel. Individuals could now obtain a quota share provided that they either bought a fishing vessel or a fish factory of some kind or the other within two years of the initial allocation. Also, the Board reserved the right to reduce the asset size of a quota share if in its opinion the conditions attached to the rights had not been fulfilled—it added to the list a code of conduct for responsible fishing. Finally, the Board enabled itself to award quota shares to fishery community trusts, a decision that courts ruled against (Stuttaford, 1994).

In 1993, two other important events impacted on the South African fisheries. First, the newly independent Namibian government declared its 200 nautical mile EEZ and cancelled all foreign rights to its fisheries, including those of South Africans who previously held quota shares in Namibia. Second, a unique industry organization called the Fishing Forum was established under the initiative of the ANC and the fishing industry. The aim of this body was to examine distributional issues and after the first democratic election to make recommendations to Government on fisheries policy.

On 27 October 1994 the process of developing a new national fishing policy was formally launched under the auspices of the Fishing Policy Development Committee (dealt with in the next section). The original Quota Board's term of office came to an end in November 1994 and a new Interim Quota Board was appointed in December 1994 to sit until such time that the deliberations of the Fishing Policy Development Committee determined its fate. Also in 1994, the Convention on the Law of the Sea became International Treaty Law formally protecting the 200 nautical mile EEZ.

The Interim Quota Board continued to apply the allocation guidelines of the original on an annual basis. This included new allocations for the newly established hake hand-line (1994) and hake long-line (1994) fisheries as well as roughly applying the 80:20 rule to distribute quota shares to people from historically disadvantaged communities. During this period a new policy and eventually a new Act was drafted to govern South Africa's fisheries under a new and non-racial political regime. On the broader political front, the Government of National Unity was formed after South Africa's first democratic election in 1994.

2.7 POLICY DEVELOPMENT AND THE WHITE PAPER: 1994—1998

2.7.1 Introduction

The Fishing Policy Development Committee was instituted on 27 October 1994 (Cochrane & Payne, 1998:87) and had to apply itself to the challenge of balancing the equitable distribution of quota shares, ensuring marine environment resilience and at the same time attempting to achieve stability in the fishing industry. On top of this it had to deal with many different political pressures relevant at the time, it had to ensure that it prescribed to the ideals of the forthcoming Constitution and it had to take into consideration the many different interest groups involved. Fundamentally, it also had to determine the style of governance principles under which fisheries would be managed in the future, namely, a choice between a top-down partial libertarian (command and control) regime, libertarian (market-orientated) regime or what Hersoug & Holm (2002:48) call a community (a bottom-up approach) regime.

Many different interest groups had to be represented in the policy drafting process. This presented the first obstacle facing the Fishing Policy Development Committee,

but was solved the following year after the demands for greater representation particularly by coastal communities and coastal provinces, were met (Cochrane & Payne, 1998:89). Also, a group of *informal fishers* who were involved in poaching activities because of discriminatory laws, argued successfully for representation on the Committee. The size of the Fishing Policy Development Committee increased to 61 plenary members and a working committee with technical subcommittees dealing with eight different focus areas. In June 1996, the Fishing Policy Development Committee submitted a draft policy that was published, after some inputs by an independent panel, as a White Paper in June 1997 (Cochrane & Payne 1998:87-90).

What is immediately obvious from both the draft and the White Paper is the acceptance of a libertarian, or market-based, solution to the design of individual fishing rights and the redistribution of quota. With a focus on commercial TAC fisheries, the goal was to replace the regime of annual quota shares with "...real rights or other forms of secure rights purchased through a transparent and competitive process." (RSA, 1997a:section 4.4). The vision was that "[t]hose who purchase rights will have a real, long term asset and will be able to take a long term view and make investment decisions which will allow them to sustain their competitiveness." (RSA, 1997a:section 4.2). The distributional objectives were stated in terms of greater access and empowerment to historically repressed people through a private development company. Other important recommendations were that quota allocations should be put back into the political arena and that proportional quotas (as a percentage of the TAC) should replace fixed quotas. Better conditions of employment were also recommended.

2.7.2 Quota Distribution: A Market Solution

Based on the Commission's recommendations, the White Paper proposed that the concept of an independent quota board was fundamentally flawed (RSA, 1997a:4.2). Its reasoning (RSA, 1997a:5.10.2) was: first, that an independent body was no more immune to excessive lobbying than a political one, second, that it required expensive administrative structures and was therefore a waste of real resources and, third, that the Minister is ultimately accountable and should therefore have ultimate powers in allocating individual fishing rights.

The White Paper (RSA, 1997a) also took the view that market forces should determine the distribution of quota shares, subject to limited intervention to correct for racial inequalities. The proposed initial distribution mechanism was supposed to work by the use of closed tender, or closed auction, system where only qualifying individuals or companies could bid for quota shares (RSA, 1997a:4.6.2.2). In line with the world trend toward individual and transferable quota shares (ITQs), emphasis was placed on security of tenure, tradability and divisibility of quota shares. First, tenure with a maximum of 50 years and a minimum of 10 years, depending on the fishery involved, was recommended in the White Paper (RSA, 1997a:section 4.6.2.1). After the stipulated period, the right reverts back to the state. Second, quota shares should be tradable, but limited to South African citizens, subject to consent by the state authority (RSA, 1997a:section 4.6.2.3) and with a ceiling on percentage of the TAC held by a single individual[15]. These conditions for security of tenure were expected to give quota real tradable value, namely, to be able to register a bond over the quota share and to allow attachment by a judgment creditor (RSA, 1997a:section 4.6.2.3). Third, the divisibility of the quota share into smaller asset units was allowed but limited to a minimum specific asset size for a particular technology (RSA, 1997a: 4.6.2.1).

A proportional quota distribution system was also proposed. Quota shares would be calculated as a percentage of the TAC for a particular species. The TAC will be determined on an annual basis and the incidental catch of non-quota species stipulated as a percentage of the proportion of TAC for which the right is held (RSA, 1997a:4.6.2.1-3). Essentially, a permit attached to a fishing vessel with the right of access to that particular fishery activates the quota, but the owner of the quota need not necessarily hold a permit or own a vessel[16]. The role of permits was rather to ensure responsible fishing practice by "...specify[ing] the technical [biological, gear and geographical] control measures" (RSA, 1997a:4.3).

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[15] Individuals are legal persons or natural persons.
[16] The White Paper still stuck to the idea that an investment in fish processing establishments was sufficient grounds to warrant a 'monopsonistic' quota share.

2.7.3 Redistribution and Empowerment

The second policy problem faced by the Fishing Policy Development Committee was the issue of redistribution and empowerment initiatives to correct for non-market discrimination during apartheid. The proposal was to create a commercial public company with the sole purpose of holding quota shares and leasing them at a negotiated price to selected people from historically repressed racial groups. This was expected to be a quick first phase followed by the full-blown market solution in a second phase. In other words, the Fishing Policy Development Committee, and the writers of the White Paper (RSA, 1997a:4.6.1), expected redistribution and empowerment to occur very quickly. Because of the closed tender system, the White Paper (RSA, 1997a:4.6.1.3) added, opportunities to tender for rights particularly in the second phase should be given to "...disadvantaged individuals and companies who have invested in the industry or have a history in the fishery. In addition, previously advantaged companies who have made significant progress in transforming [by applying affirmative action policies] themselves..." (RSA, 1997a:4.6.1.3). Suggestions for advantaged company transformation were: to expand equity ownership in fishing companies, to restructure to smaller scale operations, to encourage contracts with processing companies and to assist small-scale fishers to improve efficiency (RSA, 1997a:4.5).

2.7.4 Advisory Bodies

The Fishing Policy Development Committee recommended a number of bodies that would serve to advise, and provide inputs into the decision making process made by the Minister through the Sea Fisheries Chief Directorate. The most important was the Consultative Advisory Forum which would be an independent statutory body appointed by the Minister to advise on: management and development issues in the various fisheries, proposed changes to fisheries management and legislation, establishment and amendment of management plans, the TAC, research needs, allocation of fisheries sourced revenues and any other matters referred to it by the Minister (RSA, 1997a:section 5.10.4.1). Provision was also made for other fishing interest groups, in addition to the fishing industry associations already in existence, to make representation at their own cost. The point of recommending the various advisory and representative structures discussed above and several substructures was

to enable better communication between the Chief Directorate and the fishing industry.

An important milestone that occurred during the time of the Fishing Policy Development Committee was that in 1996 Dr Monde Mayekiso was the first person of African origin to become Chief Director of Sea Fisheries.

2.7.5 Conclusions

The most fundamental change proposed by the Fishing Policy Development Committee and largely accepted in the White Paper was to adopt, in line with other important fishing countries around the world, a market solution to the fisheries management problem. This was to be based on the principle of long-term secure, valuable, tradable and divisible individual quota shares indexed as a percentage of the TAC. The initial distribution, at least to established fishing companies, was to be determined by a closed tender, or auction, system. A rapid redistribution and empowerment phase was expected to be achieved through a private 'quota holding' company that leased quota shares to deserving individuals from historically repressed racial groups. This system was expected to do away with the yearly quota distribution problem, making the existence of a Quota Board marginal and thus also safe to move ultimate powers in allocating individual quota shares into the political arena[17].

2.8 THE MARINE LIVING RESOURCES ACT: FROM 1998

2.8.1 Introduction

The formation of the Marine Living Resources Act of 1988 is described by Hersoug & Holm (2002:78-82) as follows. The Fisheries Policy Development Committee produced a Green Paper on fisheries policy in June 1996, from which a White paper was drafted including recommendations from an external Access Rights Panel[18]. The White Paper was distributed for comment, but because speedy results were required

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[17] The solution seemed like a wish list provided by the vertically integrated monopsonistic fishing corporations outlining perhaps the most flexible fisheries management system in the world (see chapters 3 and 4) and only manageable within a highly concentrated industrial structure (see chapter 4).
[18] In fact, as is described above and more formally in chapter 4, quota holders do not have automatic access rights to the fishery. This panel only makes recommendations on the structure of quota shares or how the resource rent is traded and distributed.

and because "...it was impossible to implement the proposed policy through the existing law" (Hersoug & Holm, 2002:80) a Marine Living Resources Bill was produced, but without awaiting the responses to the White Paper. The Portfolio Committee of Environmental Affairs and Tourism, however, was not happy with the market-orientated structure of individual quota shares, but compromised and tabled the Bill with only technical amendments. The Marine Living Resources Act became effective by June 1988.

The objectives and principles of the Act (RSA, 1998:section 2) are based on three pillars, namely, sustainable use (paragraphs a, b, c, e, f, g), fishing industry stability and growth (paragraph d and h) and distributional equity (paragraph j). In essence, the Act did the following: first, it provided substantial political powers to the Minister of Environmental Affairs and Tourism. In the words of Plasket (2001:43): "The foundation for much of the regulatory system is to be found in a range of powers granted to the Minister. Indeed, for all intents and purposes the Minister is the only functionary who exercises any power to speak of in terms of the Act." Second, it accepted, with wide-ranging ministerial discretionary powers, the market-orientated structure of quota shares recommended by the Fishing Policy Development Committee. Third, it dealt with the distributional equity issues by providing for an elected body and not, as recommended in the White Paper, a private company and, finally, it for the first time recognized the existence of subsistence fishers and their rights.

2.8.2 Stability and Growth

This section deals with the stability and growth pillar of the Act, a partial market solution. The Act provides a Ministerial option on the security of tenure clause by allowing quota shares to be granted for a period of up to 15 years (RSA, 1998: section 18 (5)). This provision, however, does not bind the Minister to grant quota for more than a single year. Section 21 (RSA, 1988) completes the fundamental conditions for a potential market solution by allowing a commercial quota share to be divided and transferred, but again subject to various conditions and approval by the Minister. Also, section 13 (RSA, 1998) stipulates that for the quota to be activated, the Minister must issue a fishing vessel permit for a period not exceeding one year which, in Section 23(1) of the Act, allows the vessel the right of access to the fishing grounds.

Nowhere in the Act does it stipulate that an individual needs to have access to a fishing vessel to be granted a quota share (although quota holders are encouraged to have access to a vessel or a fish processing establishment). This opens up a number of possibilities. At the one extreme, quota holders can transfer their right to a portion of the TAC at a negotiated price to a vessel owner[19] with access to the fishing grounds. This is called a 'paper quota'. At the other extreme, a vessel owner with access to the fishing grounds but no quota share leases a quota share, at a negotiated price, from the 'paper quota holder'. In other words, the regulations do not stipulate a link between the right to withdraw (quota shares) and the right of access. The transferability and divisibility of quota makes this situation possible. This dual rights system, which initially emerged during the 1940s and 1950s as factory production quotas (or better termed monopsonistic quota shares) in the pelagic and west coast rock lobster fisheries, is examined formally in chapter 4. The concept does, however, provide problems on deciding the *right to participation* and may result in excess capacity as it "...is probably unconstitutional: to grant a right with commercial value and then prevent its exercise would amount to an arbitrary deprivation of property..." Plasket (2000,48). In other words, once an individual has been granted a quota share, no matter the asset size, that person probably has the constitutional right to buy, or lease a fishing vessel and harvest the applicable portion of the TAC.

Finally, the fixed quota distribution system initiated by Minister Wiley, established at the time of the Diemont Commission and instituted by the Quota Board, remained. Section 14(4) of the Act stipulates that "[I]f the allowable commercial catch in respect of which commercial fishing rights [quota] exist, increases, the mass of the increase shall be available for allocation by the Minister" (RSA, 1998:section14(4)). Not only does this section reject the notion of allocating quota as a percentage of the TAC, but it also seems to allow the continuation of the 80:20 rule initially devised to broaden access in the fishing industry. It is, however, not a necessary condition in the division of the TAC and the allocation of quota shares.

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[19] Which may also be an individual or company who leases a vessel.

In essence stability is supposed to be achieved through the market exchange of long-term quota shares, which are tradable and divisible. Also the link between access rights and quota shares is separated, allowing the occurrence of paper quota holders (usually for new quota holders) and monopsonistic quota holders (usually for established vertically integrated fishing companies). What is disturbing is the lack of guidance on strict criteria for the right of participation. The fishery is definitely not restricted to fishers, in fact it seems to encourage monopsonistic sea lords, who would benefit most from a market solution, particularly in the control over the TAC and security of raw inputs, namely, fish or other marine living resources.

2.8.3 Distribution, Equity and Empowerment

This section deals with the distributional equity pillar of the Act. The Act (RSA, 1998: part five) created a new organizational structure called the Fisheries Transformation Council tasked with the facilitation of "...fair and equitable access to...rights [quota]" (RSA, 1998:section 30). In effect, the Minister allocates a portion of the TAC to the Council who then "...lease rights [quota shares], according to the criteria determined by the Minister, to persons from historically disadvantaged sectors of society and to small and medium sized enterprises." (RSA, 1998:section 31(2)). Presumably, "...the mass of the increase [in the TAC]...[made] available for allocation by the Minister" (section 14(4)) is the quota share allocated to the Council. In addition, the Council is also expected to "...assist in the development and capacity building" (RSA, 1998:section 32(d)) of the same groups.

The problem of implementation comes in because council members are appointed by the Minister, who may take into consideration nominations by interested parties (RSA, 1998:section 34(3)) on a part time basis to arguably fulfill the most difficult task facing the fishing industry. The Council sat during the 1998/99 allocations, still officially under the Quota Board, and walked out *en mass* shortly afterwards. It did not reconvene for any subsequent allocation process[20] (Kaye, 2003:pers comms). The newly named fisheries authority, Marine and Coastal Management (MCM), took on

[20] According to the Act "The Minister may by notice in the Gazette, after consultation with the forum, abolish the Council" (RSA, 1998:section 37). This, however, has never been exercised, perhaps through oversight or because there is no Council to consult—the Council in effect still exists in institutional form.

this responsibility and proceeded to distribute and redistribute quota shares on an annual basis and finally for a four year term[21] in 2001 (this is covered in the next section).

2.8.4 Organizational Change: Marine and Coastal Management

In October 1998, Sea Fisheries Chief Directorate was renamed Marine and Coastal Management Chief Directorate (Mayekiso, 2002:pers comms). Delegated to it by the Minister[22], it assimilated the quota distribution duties of the Quota Board, and later also the redistribution and empowerment functions of the Fisheries Transformation Council. In addition, the Sea Fisheries Research Institute, along with non-fishing research and coastal management, was formally included into the structures of Marine and Coastal Management. Earlier in 1995 and 1996 respectively, the compliance and policing functions and coastal structures were assimilated into the Sea Fisheries Chief Directorate. In response to the increased responsibilities, the Chief Directorate of Marine and Coastal Management was upgraded to Branch status (with a Deputy Director General and three Chief Directorates) on 1 January 2000 (Mayekiso, 2002: pers comms).

2.8.5 Advisory Body Changes

A newly constituted statutory advisory body called the Consultatory[23] Advisory Forum for Marine Living Resources replaced the Sea Fisheries Advisory Committee. The duties of the forum are not substantially different from that of the Sea Fisheries Advisory Committee, namely to advise the Minister on matters of fisheries management, policy, research and regulations (RSA, 1998, section 6). The Consultative Advisory Forum's composition, however, is intended to resemble more closely the demographic makeup of South Africa by being "broadly representative and multidisciplinary, with members qualified to make a substantial contribution

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[21] Abalone quota shares were only awarded for a two year term because of resource management problems and the wide scale incidence of poaching.

[22] In terms of section 79(1) of the marine Living Resources Act, the Minister may 'upon the conditions that he or she deems fit, delegate any or all the powers conferred upon him or her in terms of this Act, save a power to make regulations, to the Director General or an officer of the Department nominated by the Director General' or 'delegate any power conferred upon him or her in terms of this Act, excluding the power to make regulations, to an authority in the local sphere of government'.

[23] The Consultatory Advisory Forum, is usually called the Consultative Advisory Forum or the CAF. From here on, it will be called the Consultative Advisory Forum or the CAF.

towards the proper functioning of the forum" (RSA, 1998:section7). The Act makes particular mention of a representative and multidisciplinary body, first, in order to ensure that the interests of the historically repressed communities are in line with the distributional equity pillar of the Act and second, because a multidisciplinary approach is a necessary prerequisite to achieve the second pillar of the Act, namely, fishing industry stability and growth, as well as taking the human element into consideration. In addition, section 8 of the Act provides that the Consultative Advisory Forum shall give consideration to the representation of recognized fishing industry bodies and interest groups. The Consultative Advisory Forum for Marine Living Resources first met on 1 September 1998 and last sat on 31 August 2001 (Hecht, 2003:pers comms).

2.8.6 Levies, Leases and Revenue

Prior to the Marine Living Resources Act, a research levy placed on fish landed or caught was the instrument used to finance the Sea Fisheries Research Fund. The fund was used for research expenditure surpluses over and above the income transferred by the central government. Basically, during this time marine science research was well resourced and, even in the face of international sanctions against South Africa, managed to establish a world-class research programme (Payne & Bannister in Warman, 2002:246-254).

The Sea Fisheries Research Fund was abandoned in the new Act and the Marine Living Resources Fund, with broader spending and revenue collecting powers, was statutorily constituted. An important feature of the expanded revenue collecting powers provided for by the Act is that "...rights [quota shares]...shall...be leased by the State" (RSA, 1998:section 22). Bearing in mind the institutional separation of quota holders who share the TAC from access rights holders who actually do the fishing, the State for the first time could raise revenues directly from the quota holders. This instrument of leasing rights, however, is still not used today. The bulk of revenues collected is still in the form of the previous research levy on landed catch and quota shares are essentially free.

Further, in a surprising move the Director General of the Department of Environmental Affairs and Tourism[24] announced during 2001 (Bross, 2002:pers comms), contrary to international experience on cost recovery in fishery, that all operational expenditure of the entire Marine and Coastal Management Branch would be financed out of the Marine Living Resources Fund (Mayekiso, 2003:pers comms). Because only a portion of operational expenditure directly benefits the fishing industry[25], a 'research' levy on commercial fishing with free individual fishing rights, to raise the bulk of the Branch's operational revenue, is probably not possible or fair.

2.9 DISTRIBUTION POLICY UNDER THE NEW ACT: 1998—2002

2.9.1 Introduction

The aim of this section is to throw some light on the thinking of MCM[26] and other stakeholders with regard to the distribution and structure of quota shares and the issues of equity. Basically, the three years since the enactment of the Marine Living Resources Act of 1998 and preceding the 2001 medium-term quota share distribution round have been described by Hersoug[27] (2002:201) as the "three lost years". Kleinschmidt (RSA, 2001:2) portrayed the quota share distribution process as subjective and given to chance and Hersoug (2002:201) characterized them as marked by conflict, lawsuits and discontent among almost all participants and stakeholders. This is not surprising, given that no clear guidelines were provided on the *right of participation* and free quota shares, of usually small asset sizes to unverifiable legal entities, were awarded in the name of redistribution and equity. In fact, the chaos described above, coupled with the many additional tasks MCM had assimilated since 1998 (section 2.94), led to an organizational failure of the Branch.

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[24] Dr Crispian Olver

[25] Marine and Coastal Management is also responsible for non-commercial fishing activities such as coastal management that directly benefit all coastal dwellers and holiday makers, subsistence and artisanal fishing, Antarctica and various islands, to name a few.

[26] The actual patterns of distribution of quota shares (resource rents), fishing skills (human capital) and access rights (fishing capital) are covered in chapters 5, 6 and 7.

[27] A visiting professor at the University of the Western Cape and a fisheries consultant to the South African government via the Norwegian Agency for Development Co-operation (NORAD). The Norwegians played an important role in the development of the Marine Living Resources Act and in the subsequent management of redistribution.

The Norwegian Agency for Development Co-operation (NORAD) advisor to MCM, S Munkejord (RSA, 2000c:1), attributed the three lost years to the fact that although "...the provisions of the [Marine Living Resources] Act leave considerable flexibility for political and managerial discretion...[and]...these enabling provisions and decision making mechanisms are powerful legal instruments for creating clarity and un-ambiguity regarding fishing rights [quota share] allocation policy,...[they]... unfortunately still remain to be adequately harnessed" (RSA, 2000c:1).

A rollover year recommended by the Consultative Advisory Forum for the 2000 fishing season (see appendix A2) provided the authorities with a window of opportunity to re-examine their fisheries management framework, structure of rights, redistribution and black economic empowerment policies in time to allocate four-year quota shares and two-year quota shares in the case of they abalone fishery. On 31 May notification in the Government Gazette (RSA, 2000e) amended the Marine Living Resources Act to 'roll over' in effect the one-year quota shares allocated to individuals for the 1999/00 season into the 2000/2001 fishing season. The following sub-section examines the various recommendations and the policy guidelines that were published for the medium term quota shares preceding the 2001 adjudication process.

2.9.2 A Third Chance: 2000-2001

The third attempt at developing policy[28] started 23 June 2000 (Hecht[29], 2001:pers comms) with a list of 10 questions the director general[30] of the Department of Environmental Affairs and Tourism posed on distribution and allocation policy to the Consultative Advisory Forum[31] and a further two questions posed by the deputy director general[32] of MCM. The questions are listed in appendix A2. The questions posed by the two top bureaucrats in fisheries indicate that they were aware of the serious problems with the distribution and the pricing of quota shares as well as the organizational failure of MCM. With regard to their distribution policy they indicated

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[28] The first chance was under the Fisheries Policy Development Committee and the second in the drafting of the Marine Living Resources Act.
[29] Professor T Hecht was a key member of the Consultative Advisory Forum while it lasted.
[30] Dr C Olver
[31] It is interesting to note that the Consultative Advisory Forum ended its term before the medium-term quota share allocation round and has not reconvened since.
[32] Mr H Kleinschmidt

the following concerns with i) the distribution of quota shares and the division of the TAC between existing quota holders, new quota holders and between fishing enterprise size, ii) the criteria for judging the suitability of candidates as new quota holders—the right of participation operational rule, and iii) the extent to which MCM should encourage fishing firms to normalize their employment policies. Issues over the pricing of quota shares and other levies were as a result of the director general announcing that MCM would be a self-funded branch of the Department of Environmental Affairs and Tourism (Mayekiso, 2002:pers comms).

Following the recommendations of the Consultative Advisory Forum, Klienschmidt et al (2002:242) report that two phases of consultations between MCM and the fishing industry stakeholders took place. First, aggrieved parties were given an opportunity to raise their concerns and second, MCM published two draft quota distribution policy documents and called for fishing industry input. The aim was to produce a "[m]anual for the management of the South African Fishing Industry" (Kleinschmidt et al, 2002:242). The manual was not, however, completed in time, but a set of policy guidelines was circulated with the medium-term quota application forms.

2.9.3 Recommendations of the Consultative Advisory Forum

Before making its recommendations, the Consultative Advisory Forum took into consideration inputs from the fishing industry. Two of the inputs are available, namely, one from the two largest fishing companies (Irvin & Johnson and Sea Harvest) and one from the Association of Small Scale Hake Industries (ASSI). The responses reveal to some extent the thinking of the various stakeholders, albeit largely in the hake fisheries.

In response to the call from the Consultative Advisory Forum, Penzhorn[33] (2000) responded on behalf of Sea Harvest and Irvin & Johnson and proposed the following solution to the problems of quota share distribution and black economic empowerment. Penzhorn (2000) proposed a not-for-profit company[34] as joint venture between themselves (private fishing sector) and MCM (with 50% voting rights by

[33] The Managing Director of Sea Harvest Corporation Ltd during that year.
[34] They even gave a name to this company, that is, the New Entrants Development Company.

both parties). In essence the company would be the only adjudicating and distributing agency for new quota shares. The right of participation requirements were to be i) a demonstrated involvement in the fishing industry, ii) a willingness to enter into joint venture agreements with other participants in order to form viable economic units and iii) a willingness to participate in the company. Once a new entrant was admitted as a company participant (as a new quota holder) the company would provide the following services: i) develop a business plan and a budget, ii) determine the asset size of the quota share required to implement the business plan, and iii) negotiate joint venture agreements, the acquisition of resources (finance, vessels and so on) and the sale or delivery of fish products to the processing and marketing companies. They would also provide much needed extension services in terms of skills acquisition to new quota holders, as well as providing a liaison function between the new entrants and the existing industry. On the issue of asset sizes, Penzhorn (2000:section 8) stated "...that an allocation [asset size] of 1000 tons is the minimum allocation [asset size] that is economically viable, and even then only with assistance from NEDCO [the company]".

Penzhorn (2000) stressed that the company would not be a financing organization, but in light of the fact that formal financing organizations would require agreements to be in place for the processing and marketing of the catch (as a reduction of risk), they (Irvin & Johnson and Sea Harvest) would enter into such agreements with the participants of the Company to "ensure that the interests of the participants are protected" (Penzhorn, 2000:section 7). Further, for this plan to be implemented, Penzhorn (2000:section 9) provided a pre-requisite, namely "...long term fishing rights [quota shares] to the established industry at the same levels [asset sizes] as in the 1998 fishing season".

In effect these recommendations mirrored those on redistribution and empowerment in the White Paper (RSA, 1997a:section 4). However, the benefits associated with this proposal are strong, namely, i) the identification of the very important need for a partnership between the private fishing sector and MCM to effect "...acceptable levels of transformation [redistribution of the TAC and black economic empowerment]..." (Penzhorn, 2000:section 9), ii) the crucial element of extension services to new fishing companies if black economic empowerment is to be successful

and iii) an industry determined minimum asset size. However, the costs are high, namely, i) the company has power to determine the right of participation, ii) the monopsonistic position of the established industry is protected and entrenched by controlling the TAC at 1998 levels through long-term quota shares and iii) as a result of point two, the available part of the TAC left over for redistribution is very limited.

Although the Association of Small Scale Hake Industries is essentially concerned about the hake TAC split (see chapter 7) between the hake trawl fisheries (deepsea hake trawl fishery and inshore trawl fishery) dominated by large corporate fishing companies and the hake line fisheries (hake long-line and hake hand-line fisheries), the general principle applies to most single owners, or small fishing companies. Kaye[35], representing the Association of Small Scale Hake Industries (ASSHI, 1999a), put their concerns that they "...never wanted it to become an us/them situation with entrenched industry and the scientists arraigned against the SMMEs [small, medium and micro enterprises]" and that the Consultative Advisory Forum should "...understand that the small boat and processor sector represent a vehicle for change in the industry that would create wealth for those at the poorest end, in a way that would be effective and unintrusive for the industry." (Kaye in ASSI, 1999a:1).

A survey of small vessels and processing factories undertaken by the Association of Small Scale Hake Industries (ASSHI, 1999b) provided a convincing argument[36] that managing the micro to small and medium vessel fisheries as a multi-species fishery and not the current single-species approach would have a desirable effect, particularly on fisher employment and potentially on black economic empowerment initiatives. The current single-species approach distributes the TAC as quota shares on a species-by-species basis, whereas a multi-species approach would distribute bundles of quota shares of different species to particular vessels. In this way, fishers would be employed for longer—a significant portion of coastal poverty results from seasonal employment on fishing vessels (ASSHI, 1999:2)—as the bundles of quota shares would be linked to the economic viability of the fishing vessel. Also, the right to participation has to be more closely aligned to the fishers as opposed to corporate sea

[35] Kaye is the president of the Association of Small Scale Hake Fisheries.
[36] Appendix 2 provides more detail on the points made in this survey.

lords. The approach also automatically controls the capacity of the fishing fleet to harvest marine living resources. Capacity management is considered by the Food and Agricultural Organization of the United Nations (FAO) as the most important issue threatening the sustainable use of living marine resources today (FAO, 1995).

With at least the above inputs in mind, the Consultative Advisory Forum drafted its recommendations. On the three fundamental questions i) the distribution of quota shares and the TAC split between existing quota holders and between enterprise sizes, ii) the criteria for judging the right of participation for new quota holders and iii) and the extent to which MCM should encourage existing fishing firm to normalize their employment policies, the Consultative Advisory Forum provided the following policy principles:

a) The distribution of quota shares (and presumably the division of the TAC) should reflect the racial demographics of the country. These equity goals should be achieved over time and with regard to the specifics in each fishery and the level of distribution already implemented (CAF: 2000a:2).
b) Large fishing corporations are important, particularly as they add value to the fish products and are internationally competitive. This is particularly relevant in light of the fact that the fishery is a stagnant sector where fish output is unlikely to be increased (CAFa, 2000a:2,3,4). Equity goals should accordingly be achieved internally in the corporate structures through, for example, employee share option schemes and accelerated affirmative action, particularly under the professional or managerial skills group. Long-term quota shares could be used as incentives to comply with certain criteria (CAF, 2000b:1,2).
c) Competition within the fishery can be encouraged by the promotion of micro, small and medium fishing enterprises. They believed, however, that the optimum balance between large fishing corporations and smaller fishing business is an economic question and needs detailed studies. (CAF, 2000a:2,3).
d) The number of micro, small or medium sized fishing enterprises "...depends on the size of the smallest viable economic unit [asset size] (a calculation based on vessel size and quota [asset size]) divided by the portion of the TAC reserved for the small/medium sector" (CAF, 2000a.4).
e) On the question of right of participation, the Consultative Advisory Forum was quite clear that new quota holders should be "...entrepreneurs with good business

skills, who may on their own or preferably in partnership with fishers or broadbased investment groups build and operate strong businesses in the fishing industry" (CAF, 2000a:6). In other words, business skills and links with large corporate fishing companies were viewed as more important than fishing skills as a right of participation criterion—suggesting that fishing resources are for business people and not fishers.

f) On the conditions of employment the Consultative Advisory Forum pointed out that "[f]ishermen are not classified as employees and therefore do not fall under the provisions of the Basic Conditions of Employment Act" (CAF, 2000a:7). The phenomenon arises from the fact that fishers are usually paid a certain fee for their catch and act essentially as free agents. The Consultative Advisory Forum suggested that the conditions of employment aboard fishing vessels could be influenced by MCM. It is interesting to note that the Diemont Commission also addressed this issue 14 years earlier.

The important issues here are that i) MCM (who provide information to the Consultative Advisory Forum on request) obviously had no idea of the racial distribution of the quota shares they issued during the previous two rounds, let along the racial distribution of fishing skills or fishing capital, ii) no economic data or information was available, iii) minimum asset sizes were considered important but only with regard to the medium, small and micro fishing enterprises and iv) business skills are seen as more important than fishing skills for the right of participation.

The Consultative Advisory Forum was at the same time asked to comment on the public finance issues regarding direct taxation and levies by MCM. It advised a progressive structure for an application fee, a landing fee with rates based on a cost recovery principle (the costs to MCM of managing each particular fishery) and a lease fee (a royalty) set on the basis of economic rent (CAF, 2000a:1-3).

2.9.4 The Policy Development Process

In response to the Consultative Advisory Forum's framework of policy principles, MCM published two draft discussion documents (RSA, 2000a and RSA, 2001a) with the purpose of eliciting response from all stakeholders in the South African fishing sector. The fundamental realities confronting MCM and the various fisheries (RSA, 2000a:3-4) were that i) there was over-capacity (too many fishing vessels) and the

subsequent over-fishing in many fisheries, ii) there was a lack of economic and structural information to make informed decisions, iii) the evaluation of the right of participation criterion was not objective and iv) MCM had suffered an organizational failure which was partly manifest as administrative under-capacity and a lack of resources to deal with the adjudication of the many applications for quota shares in the various fisheries.

Basically, because of no clear right of participation criteria, except perhaps on the grounds of previous racial discrimination, the number claims for a quota share increased. MCM was thus faced with an expanding amount of informational requirements to implement and enforce their system efficiently (see chapter 4). The information overload made it very difficult for MCM to verify the applications of potential new quota holders, giving rise to a classical adverse selection problem. Furthermore, once an individual, usually a company, was awarded a quota share, usually of non-viable asset sizes and leased it to a fishing company, the informational requirements to track the various transactions led to a moral hazard problem. Transaction costs in the private fishing sector increased; quota shares had now to be leased, or joint ventures formed, from a progressively larger pool of new quota holders with smaller asset sizes. In addition, because the perception existed that quota shares were often awarded on the grounds of who lobbied the most (Hersoug, 2002:202), there was a substantial increase in influence costs[37] to both new entrants (as rent seeking behaviour), to MCM (being the central decision making authority) and to the established fishing firms (to retain their quasi-rents). These contributed to the organizational failure of MCM.

In the first draft policy discussion document (RSA, 2000a) MCM proposed to deal with these problems by making clear regulations regarding right of participation, asset sizes, term of quota shares, the tradability of quota shares and quota holder evaluation criteria. In addition, MCM proposed to establish a dedicated quota share distribution unit, build communication networks with the private fishing sector (perhaps towards

[37] Influence costs are described by Milgrom & Roberts (1992:600) as "The costs incurred in attempts to influence other's decisions in a self-interested fashion, in attempts to counter such influence activities by others, and by the degradation of the quality of decisions because of influence." Influence costs obviously only exist if it is perceived that the decision maker can be influenced.

greater self-regulation), reassess the various institutional bodies defined by the Marine Living Resources Act, develop a quota share pricing mechanism, institute an application fee, implement an economics study[38], and finally increase their enforcement function (RSA, 2000a, 1-27). The document also proposed (RSA, 2000a:28), a tender process coupled with an attrition clause[39] to allocate the quota shares. The tender process would be a restricted (based on some future definition of the right of participation) sealed bid auction. Bidders would offer a price per ton (a maximum tonnage was proposed) and a quantity required. A list of bidders would be arranged from highest to lowest price and quota shares allocated to those bidders (from highest to lowest) until the TAC was exhausted. The final price would be the last price on the list of successful bidders.

After the publication of the first draft policy discussion document, MCM received recommendations from two international organizations (RSA, 2000c&d), namely the Norwegian Agency for Development Co-operation[40] (NORAD) and the Food and Agricultural Organisation of the United Nations[41] (FAO). Munkejord from NORAD (RSA, 2000c), proposed two models, namely, a *criteria-based individual assessment procedure* and a *market-based approach* (RSA, 2000c:13-120). Cochrane (RSA, 2000d) from the FAO, concentrated on an *automated* allocation process to ensure objectivity in terms of verification problems and, very importantly, the issue of fishing over-capacity.

The criteria-based individual assessment (RSA, 2000c:15-19) is founded on the assumptions that i) the TAC is determined, ii) the TAC split between subsistence,

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[38] The Consultative Advisory Forum was aware of the almost complete lack of economic input into the issues of fisheries management and suggested a study be conducted to correct for this. MCM accordingly commissioned an economic study to be completed within a period of five months (RSA, 2001a:4) and to provide analysis, among others, on minimum viable asset sizes, direct taxation structures and rates, the TAC split between enterprise sizes, a survey to determine the racial distribution of quota shares, fishing skills and fishing capital for the 16 most important fisheries. Furthermore, it was not allowed to provide policy advice—this came from the sector [fishery] planners. Also MCM advertised the project exclusively to the South African Network for Coastal and Oceanographic Research (a network for marine scientists)—clearly not an ideal solution.

[39] A cumulative percentage of the TAC is to be held aside and reallocated to deserving new quota holders by the Minister of Environmental Affairs and Tourism—the Minister usually delegates this function to a senior bureaucrat at MCM.

[40] S Munkejord was the advisory representative of NORAD to MCM at the time.

[41] K Cochrane from the FAO advised MCM. He is an ex-MCM marine scientist specialising in small pelagic resource management.

recreational and commercial fishing is known, and iii) the change in commercial TAC split between SMEs[42] and big fishing companies is also known. The first, and most important, criterion is to determine the right of participation, which should be fishery dependent and have different rules for existing rights holders and new quota holders. The rules should be simple and credible. The rules usually fall under i) technical rules including forms, fees, South African citizens, catch returns, tax compliance and so on, ii) equity rules defining clearly the issues of 'internal' versus 'external' transformation, that is, the importance of racial equity in employment and ownership of large corporations versus the role of MCM in its direct redistribution and black economic empowerment endeavours and iii) historical involvement, namely previous investment and skills acquisition in the fishery. The applicants should then, based on their responses, be scored numerically and the score weighted according to some predetermined criteria. From here, the applicants are ranked and allocated a quota share based on one of four options determined in the policy arena. These options are:

a) A lottery to determine who are awarded quota share. In the determination of asset sizes all successful applicants should be allocated a minimum viable asset size appropriate for that fishery.
b) The fishery members determine how the TAC should be divided and who gets what asset sizes.
c) Using the ranking system, the highest ranked gets last year's asset size. This is repeated until the TAC is fully subscribed. It was also suggested that new quota holders get at least a minimum asset size.
d) Every applicant with right of participation gets a quota share. In this option, the TAC can be divided equally (equal asset sizes) or based on historical asset sizes (this second option might, however, result in the exclusion of some applicants with a proved right of participation). (RSA, 2000c:19).

Munkejord (RSA, 2000c:19-22) also proposed an alternative market-based approach where, for example, either the right of participation cannot rationally be considered on a single application basis and/or the selection criteria must be based on compliance with regulations and/or the right of participation must be left to the market. The market-based model is based on the same TAC split assumptions as the criteria-based

[42] Small, medium and micro fishing enterprises.

individual assessment model. The fundamental argument behind the market-based model is: first, determine the target TAC split and the time needed to reach the targets and second, using attrition criteria, add new quota holders on a graduated basis. The yearly attrition rate, as a percentage of the TAC, can be determined on a fishery-by-fishery basis or an across-the-board attrition rate or based on enterprise and asset size. The idea behind this approach is that it could be a good instrument for restructuring a fishery, from large monopsonistic fishing companies to SMEs, with the least amount of market disturbance if the attrition rate, target TAC splits and implementation phases are clearly defined (RSA, 2000c:20-22). Munkejord (RSA 2000c:22) recommends that existing quota holders be awarded long-term rights with a built in attrition rate—this allows a degree of forward business planning. The right of participation for new quota holders can, for example, be based on a number of different aspects depending on the characteristics of each fishery.

Cochrane (RSA, 2000d:26) calls for clear and transparent rules on right of participation, an objective scoring system and the allocation of quota shares of an appropriate size such that the fishing vessels are fully occupied and able to earn an acceptable livelihood from their fishing activities. The message here is fundamentally, from an FAO point of view, one of fishing capacity management. However, it also implies that the legitimate right of participation should accrue to the fishers and that these individuals should be awarded quota shares that are economically viable (minimum asset size).

Following the first draft discussion document outlined above, MCM called for inputs from the various stakeholders in the various fisheries (RSA, 2000b). The purpose was that "...those who were to be given that privilege (right of participation) be selected according to a well defined procedure, based on broadly accepted rules and guide-lines, which for purposes of accountability and transparency are published in a 'rule book' (RB) for the allocation of rights" (RSA, 2000b:1). In other words, MCM wanted to gauge the sentiment of those people operating in the various fisheries.

MCM finally received nine[43] 'rule books' from the private sector (RSA, 2001g), but only after the second policy discussion document was published.

Most of the responses to the 'rule books', largely from established fishery representative bodies, advocated that the right of participation criteria be linked to fishing vessels or fish processing establishments (illustrating a history of participation). For potential new entrants, to redress the racial imbalances, the right of participation should be determined on whether or not the applicant had a history of participation in the fishery and whether or not they were prepared to invest in fishing capital (RSA, 2001g). In addition, all the rule books were concerned with the *paper quota* and usually with the *cardboard quota* problem. Cardboard quotas are awarded to front companies in order to capture a larger asset size. Accordingly, the general consensus was that quota shares of some minimum viable asset size would largely solve this problem and provide additional incentives for new quota holders to invest in the fishery for which the quota share was allocated (RSA, 2001g). Neither the medium vessel inshore (hake and sole) fishery nor the large vessel hake fishery, both dominated by large monopsonistic fishing corporations, submitted rule books.

Bross (2002: per comms) states that the reasons why the monopolistically dominated hake fisheries failed to provide rule books were that i) there was no consensus in approach among the members of the South African Deep Sea Trawling Industry Associations, ii) the rule books were considered meaningless—the Marine Living Resources Act was the rule book iii) the concept of the rule book was in any effect a "democratic delusion in the allocation of rights", and iv) because the rule books were to be used as inputs for the sector [fishery] planners, made up of fishing industry and scientific advisory bodies, conflicts of interest arose leading to rent seeking behaviour. Bross's (2002, per comms) belief is that "rights should be allocated in perpetuity and let other rules or laws and markets sort the allocations out".

At this time, the established corporate fishing companies were also beginning to worry about the concept of minimum viable asset sizes as a threat to their

[43] Rule books were received for the south coast rock lobster, hake long-line, handline, tuna long-line, prawn, horse mackerel, squid and west coast rock lobster fisheries (RSAa, 2001)

monopsonistic power. Previously, Penzhorn (2000:section 8) set a minimum viable asset size of 1000 tons for a deepsea hake trawl quota share. Bross (2002a) articulated the emerging perception on quota shares with minimum asset sizes as follows: "[a] truly robust and equitable system, it was hoped, would be achieved by designating the smallest operational portion of rights [asset size] that could be awarded to the widest possible spectrum of aspirants thereby giving substance to transformation [redistribution and black economic empowerment] while avoiding the pitfalls of the old system [paper quotas, presumably]" (Bross, 2002a:1). His (2002a:4-6) argument why the idea of quota shares with minimum asset sizes was faulty rested on the contention that it did not take into consideration i) that vertically integrated fishing companies and monopsonistic control of the TAC was an efficient and flexible system, ii) that it would result in a structural readjustment of the fleet tailored to influence the asset size and iii) given the above, MCM's ability to get the facts right, for example, setting a realistic minimum asset size, and their record of previous attempts at redistribution would likely disrupt the fishing industry further.

The point of the second draft policy discussion document, called *Stability, Transformation and Growth: 2001 to 2004* (RSA, 2001a), was to "...inform all stakeholders in the [fishing] industry in greater detail what motivates Government (or the Department) with respect to a number of issues." (RSA, 2001a:5). The stated goal was to build "...a fishing industry which equitably reflects the demographic composition of all our country's people...[and not]...fronting in an effort to hide white dominance" (RSA, 2001a:6). MCM promoted a two-phase incentive-based market approach to achieve these goals. It did not define the right of participation criteria but it did state that it will "...allow free business interaction and desist from being a gatekeeper or social engineer" (RSA, 2001a:7).

MCM's position on asset sizes was that an unviable asset size is a manifestation of bad business skills and not necessarily the asset size of the quota share (RSA, 2001a:6). Their rather strange argument is that people could lease quota shares from others or form joint ventures with established companies. The problem with leasing quota shares is that some quota holders must be paper quota holders in the first place otherwise there would be nobody to lease quota share from. Joint ventures likewise have been viewed suspiciously as *fronting* companies in an effort to hide white

dominance (see above). MCM's view on creating small fishing companies—which could according to the Association of Small Scale Hake Industries (ASSHI, 1999b) successfully achieve many of the distribution and stability goals, see section 2.10.2—was that most fisheries are a complicated business, fully subscribed, and that the proliferation of new quota holders would lead to potential fishing overcapacity problems (RSA, 2001a:11).

Rather, MCM took the view (RSA, 2001a:5-10) that the complexity of the fishing industry (when seen from a vertically integrated point of view) requires high level business skills, returns to scale (mainly in processing and marketing) and control over raw fish inputs as the key to global competitiveness and fishing industry stability. The MCM position (RSA, 2001a:10) is that they could use their quota share distribution policy to create incentives for these companies to institute affirmative action policies (internal transformation). In fact, although MCM (RSA, 2001a:10) was fully aware of the monopsonistic market structure by acknowledging that "[s]ome small-scale fishers are currently completely at the mercy of some fish processing factories because such factories determine price, place of delivery and other conditions" (RSAa, 2001:9), they believed that long-term quota shares would alleviate this problem by giving the small-scale fisher more bargaining power.

The second draft discussion document (RSA, 2002a:12-13) suggested a two-phased approach to achieve the three main pillars of the Marine Living Resources Act; equity, stability and sustainable use, and it also added growth. Phase 1 involved the awarding of medium-term (3 to 5 years) quota shares where, first, the large fishing companies would have time to internally achieve a certain level of affirmative action (internal transformation) in their companies and, second, *paper* and *cardboard* quota holders would be removed, presumably by allowing the large fishing companies to buy them up (RSA, 2001a:12). Phase 1 (RSA, 2001a:12) is MCM's idea of a *window of opportunity* to achieve stability and transformation (redistribution and black economic empowerment). In phase 2, having achieved a fishing industry that reflects the racial demography of the country, the policy and efforts of MCM would be "...targeted towards strengthening and supporting growth and development initiatives for both domestic and international markets." (RSA, 2001a:13).

The important new innovations to counter the organizational failure were the establishment of an objective verification unit external to MCM and the realization that those who benefited from the fisheries resources should pay an appropriate fee. The function of the verification unit was to counter the adverse selection and moral hazard problems arising out of the informational overload experienced during the 'three lost years' (RSA, 2001a:16). A user-pays principle was suggested where the previous research levy on vessel owners was to be increased to cover the costs of the fisheries management system (RSA, 2001a:10). Quota holders would still, under this system, be awarded their free quota share and the vessel owners who either held their own quota share or leased quota shares from others would be liable to pay the charge.

In other words, MCM believed that a full and complete redistribution of skills and fishing capital to reflect the racial demography of South Africa, coupled with stabilizing the fishery, could be achieved through a market based incentive approach within a period ranging between three and five years. Thereafter it would concern itself with the growth aspect of the fishery. This, they believed, could be achieved by good business skills rather than fishing skills. At this stage MCM revealed an almost complete faith in the market[44], adjusted minimally by using incentives and limited reallocation of the TAC, to reverse within three to five years the entire history of racial discrimination in South Africa. They were aware of monopsonistic power, but seemed to believe that this was necessary for global competitiveness. The next section deals with MCM's final policy decisions and the adjudication process.

2.9.5 The 2001 Medium-Term Quota Share Distribution

A notice on 27 July 2001 in the Government Gazette (RSA, 2001b) and a separate document on policy guidelines (RSA, 2001d) provided, after a third attempt, the final policy stance that arose out of the policy development process on quota shares and their distribution. These included an introduction of two new institutional bodies (a verification unit and an allocation unit), a first time application fee, the term of the quota share, and right of participation criteria. Quota shares would be awarded for a

[44] MCM, however, did not put into consideration the concept of pricing quota shares (based on their asset size) as valuable assets.

medium term, namely, a two-year term for abalone and a four-year term for the other fisheries.

Marine and Coastal Management for the first time introduced an application fee: R6000 for commercial quota share applications regardless of the asset size and R500 for limited commercial quota share applications (RSA, 2001:4c). Limited commercial quota shares have very small asset sizes and are, supposedly, aimed at encouraging black economic empowerment in micro and small fishing business. Kleinschmidt et al (2002:243) assert that the purpose of the fee was simply to reduce the number of applicants to a manageable size and to discourage opportunistic behaviour—previously some individuals applied up to 15 times, under different names, for quota. Kleinschmidt et al (2002:242) report that the strategy seemed to work, as only 5 250 applications (as opposed to 11 989 applicants during the previous round) were received of which according to Hersoug (2002:204) 2887, or 55%, of the applications were for limited commercial quota.

Without doubt, this fee strategy worked in reducing the number of applicants. However, it is extremely regressive, showing a large bias in favour of the large established fishing companies who historically commanded a large portion of the TAC[45]. For example, in the commercial hake fisheries Irvin & Johnson (the largest fishing corporation in South Africa) were awarded, from this allocation process, a quota share with an asset size of 45 431 tons (Warman, 2002:17), where Eyethu Fishing (a well-known Eastern Cape black economic empowerment fishing company) was awarded 65 tons of hake long-line (Warman, 2002: 18). In effect this means that Irvin & Johnson paid an application fee of about 13 cents per ton where Eyethu were charged over 700 times more, or R92.31, per ton. Limited commercial quota shares were only applicable to the micro to small vessel fisheries; in this case abalone and west coast rock lobster. For example, the Oceana Group through its various subsidiaries and affiliates[46] was awarded an asset size of 37 7620 kilograms nominal mass of west coast rock lobster (Warman, 2002: 29-33 & 119-160[47]) at a fee of 11

[45] In fact it is a mystery how MCM managed to get the fee structure past the scrutiny of the National Treasury.
[46] See chapter 5.
[47] See chapter 7 and appendix A1.

cents per kilogram[48]. On the other hand Kuilders Christa, a successful limited commercial west coast rock lobster quota holder and a micro black economic empowerment fishing company, received a quota share with an asset size of 200 kilograms (Warman, 2002:35) and paid an application fee of R2.50 per kilogram, in other words, almost 23 times that paid by the largest west coast rock lobster fishing company in South Africa.

The right of participation criteria adopted by MCM are published in their *Policy Guidelines with Regard to Applications for the Granting of Rights in terms of the Marine Living Resources Act 18 of 1998*" (RSA, 2001d). The document states that it wants to award a notable portion of the TAC/TAE to historically disadvantaged individuals who comply with the right of participation criteria, but not in the large vessel fisheries[49] (RSA, 2001d:2). Although "[a]ll South Africans and those in coastal communities especially, should as far as possible benefit from the limited marine living resources along our shore and oceans" (RSA, 2001d:2), the right of participation for established fishing companies is to be adjudicated on the following criteria:

a) The quality of a business plan, fishing plan or operational and investment strategy, which includes historical involvement in the fishery in question. (RSA, 2001d:2).
b) The racial distribution of ownership and employment of established and new fishing companies. Gender inequalities are also seen as important (RSA, 2001d:2).
c) Compliance with environmental catch regulations, and tax compliance, and limited to South African citizens.

The purpose of the above criteria is according to Kleinschmidt et al (2002:242) based on investment and experience (the old historic performance criterion), but this had to be coupled with demonstrated employment equity practice and black economic empowerment initiatives. In other words, the distribution of quota shares was to be

[48] The seven affiliates and subsidiaries of Oceana Group were awarded in total 377 620 kgs.
[49] While the document refers to the large vessel fisheries as capital intensive, it would be more correct to state that they require relatively large initial capital outlays. The surveyed capital intensity of the deepsea hake trawl fishery is R0.42 million per fisher with a market value of the median vessel of R12 million as compared to the pelagic fishery with a capital intensity of R0.24 million per fisher and a market value for the median sized vessel of R1.6 million (see appendix A1.1).

adjudicated on the basis of the recipient's race, on the progress the established fishing companies had made in addressing past discriminatory laws and on the business skills of the applicant.

The hake hand-line and hake long-line fisheries are targeted as vehicles to promote small black economic empowerment enterprises, but will not exceed 10% of the hake TAC[50] (RSA, 2001d:3). For new quota holders, including the limited commercial quota holders, the right of participation adjudication procedures are different and are quoted in full below:

a) "Involvement in the fishing industry;
b) A clear commitment to enter, invest and re-invest, and to share the risks of fully participating in the sector[51] or fishery;
c) Business acumen;
d) Financial capability or capacity;
e) Knowledge of the sector or fishery applied for; and
f) The capacity or the ability to catch, process and market the right [asset size of the quota share of a particular species] applied for" (RSA, 2001d:4).

The aim of these criteria is twofold. First, in the case of limited commercial quota holders, the intention is to replace subsistence and informal fishing in the micro to small vessel fisheries with small commercial enterprises (RSA, 2001d:4). Second, it is an attempt to remove the problem of paper and cardboard quota holders without having to deal with minimum viable asset sizes. In effect what these criteria do is to remove the necessity of fishing skills from the equation and to replace them with individualistic and management determined business skills. The right of participation is now restricted to businesspeople and only fishers that can demonstrate these rather substantial business skills, can claim right of participation.

The revenue collected from the application fee was to be used to appoint, first, an independent verification unit and, second, an allocation unit to adjudicate the applications against the criteria discussed above. The auditing firm Deloitte and

[50] The TAC split has not changed, see chapter 6 and 7.
[51] The colloquial term in South Africa for a fishery is a sector, but it quickly becomes confusing to use this terminology because micro, small, medium and large fishing enterprises are also referred to as sectors along with the fisheries sector as a whole, the private sector and the public sector (usually called MCM).

Touche, Sithole AB&T won the tender process for the verification unit (Hersoug, 2002:205). Their function was to analyze "...possible connections between applicants, in order to uncover front companies, illegal setups and evident paper quota applicants" (Hersoug, 2002:205). The Gauteng based Resolve Consultancy Group was used to assist Dr Mayekiso, a chief director at MCM, in the adjudication process (Hersoug, 2002:206). Here applications were first removed on the basis of improper lodging and material defects (RSA, 2001e:1-2)—basically whether applicants filled their forms in correctly and whether they complied with the right of participation criteria laid down in the policy guidelines—and, second, were '...scored against one another...and a range of [other] criteria...[including] the degree of paper quota risk ' (Kleinschmidt et al, 2002:243). Following this the successful candidates were awarded quota shares of varying asset sizes.

The criteria for deciding asset sizes in the south coast rock lobster fishery (RSA, 2001f), as an example, were i) an asset size for a new quota holder was determined at a level comparable to the asset size in respect of smaller previous quota holders and ii) the asset size for existing quota holders (who held a quota share in 2001) was based on the size awarded previously because "the applicants were all strong candidates; the sector [fishery] requires high capital investment; and there was a need to promote stability and to encourage [re]investment" (RSA, 2001f:20).

Finally, there was a complete absence of formal stakeholder input. The Consultative Advisory Forum last met 31 August 2001 and was not reconstituted with newly elected members—notices for election as early as 12 July 2001 were advertised in the Government Gazette (RSA: 2001)—in time for the final recommendations on the distribution quota shares to the Minster of Environmental Affairs and Tourism. The Fishing Transformation Council had also not been reestablished.

On balance, the two independent bodies did provide a more objective administrative procedure and served to reduce, to some extent, in conjunction with the application fee, the adverse selection problem arising from the informational overload experienced previously. Also, because the use of an external and objective verification unit was articulated in both policy discussion documents and the policy guidelines, the influence costs associated with the previous quota share distribution

rounds were substantially reduced. However, of note, is that this external adjudication process is similar in many respects to the previously debunked Quota Board.

The corporate fishing companies, in this case did not complain, as they did during the Quota Board time, mainly because the new policy guidelines were to their advantage. In fact 15 corporate fishing companies in the large vessel deepsea hake trawl fishery joined with MCM in a 2002 court battle (*The Minister of Environmental Affairs and Tourism versus Phambili Fisheries (Pty) Ltd and Bato Star Fishing (Pty) Ltd*[52]) against two new quota holding companies who demanded larger asset sizes. Based on the results of this administrative procedure, the policy guidelines and the final distribution of quota shares and asset sizes an important member of the corporate fishing companies stated that "Kleinschmidt [the deputy director general of MCM] is the best thing that has happened to the fishing industry for a long time" (Ball, 2003: pers comms).

From the micro and small fishing enterprise side, this policy has some rather disturbing characteristics. First, the shift in emphasis from the fisher to the entrepreneur is particularly worrying in regard to the limited commercial quota holders. These people were, as the policy guide states (RSA, 2001c:4), subsistence and informal fishers who presumably have fishing skills as their primary core competency and perhaps, group or community based skills with regard to marketing their catch. In other words, they are not business people who can obtain relatively high level and fishery-specific business skills overnight—they have to now demonstrate an ability to catch, process and market their catch (RSA, 2001c:4). In fact, it would be more likely for an insurance salesperson or shop owner in some fishing community to be granted a quota share than it would for a fisher. As Hersoug (2002:212) puts it "[t]here is a relatively large number of people previously fishing who have now been barred from fishing legally".

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[52] The full case name is as follows: The Minister of Environmental Affairs and Tourism, The Chief Director: Marine and Coastal Management, The Deputy Director General: Environmental Affairs and Tourism and Certain Rights Holders in the Hake Deep Trawl Fishery versus Phambili Fisheries (Pty) Ltd and Bato Star Fishing (Pty) Ltd). The certain right [quota share] holders amounted to 15 large fishing companies.

For the existing micro and small commercial fishing enterprises, it is far more difficult in a small family business, for example, to demonstrate affirmative action practice and black economic empowerment initiatives. Except for the extremely regressive fee structure, the new policy for micro-, small- and medium-sized black economic empowerment fishing companies should be favourable. However, it is considerably more difficult for an aspirant black empowerment new entrant, particularly if they are fishers to start with and not an established businessperson in some other field, to capture a quota share with a viable asset size. The cost of this new policy must therefore be at the expense of the previous subsistence fishers, micro and small fishing enterprises and potential new black economic empowerment small fishing companies that are run and operated by fishers.

Hersoug (2002:209) states that "...the political message of redistribution in favour of the *bona fide* fishers somehow got lost in the process, leaving business and stability concerns as the main ingredients", however, the deputy director general in charge of MCM considers these costs as "...a reasonable trade-off, given that we are dealing with business not charity" (Kleinschmidt in Hersoug, 2002:212). Further, on the issue of distributional success and black economic empowerment, the Minister of Environmental Affairs and Tourism stated that the result "...is a huge success in black economic empowerment" (in Hersoug, 2002:212).

Finally, Kleinschmidt (2003) articulated, in the *Fishing Industry News Southern Africa* the challenges ahead as follows:

> "Firstly, the Department is increasingly confronted with the need to issue policy with regard to a possible window period when rights [quota shares] can be traded or transferred. To date this has not been allowed, essentially to prevent newly established black-owned companies from being bought up by, or sold to, established white companies....Secondly I invite comments on the duration of rights [quota shares] when next they are allocated in 2005/06. Should we head for a 15 year right [quota share] or a shorter period of say, 8 years? Or should this decision depend on the outcome of a survey that is to be undertaken next year, the aim of which is to establish the degree of transformation [redistributional success and black economic empowerment] achieved in the industry. On the one hand an early opportunity to affect further transformation may be considered necessary, but on the other it is obvious that in such a capital intensive sector, longer term rights [quota shares] are necessary to re-capitalise assets such as vessels and gear" Kleinschmidt (2003:19).

With regard to the above statement, the MCM view on the issues still facing fisheries management is as follows. First, although heralded as a huge success in black economic empowerment, MCM is still not clear on the racial distribution of quota shares (due to company ownership and the difficulty in proving ownership criteria) or fishing skills (but this is not important any more) or fishing capital (this supposedly will reflect the demographics in a short time). Second, it is aware of the fact that markets, in the form of long-term tradable quota shares in a fishery, do not work in favour of redistribution and black economic empowerment. Third, it sees a trade-off between their distributional efforts and the re-capitalization of fishing assets.

Long-term quota shares entrench the existing distribution of quota shares, but because of the stability and security inherent in this structure it will supposedly result in a re-capitalization of fishing capital. The fact of the matter is that, particularly for large vessels this issue has been a concern, according to Bross (1999:11), from as far back as 1975 when the Department of Trade and Industry's Committee of Enquiry drew a conclusion that old vessels need to be replaced (see section 2.2.5). Basically the quasi-rents gained from fishing vessels being specific assets and South African fishing companies buying older previously subsidized vessels from the developed fishing nations (Bross, 2003: pers comms) translates to the fact that, particularly with larger vessels, their age structure is always going to have the appearance of assets that are not re-capitalized at a sufficiently fast rate.

2.10 CONCLUSIONS

Generally, before international recognition of South Africa's EEZ in 1977, the practice of restricting catch by regulating the capacity of processing and marketing companies seems to have been the favoured fisheries management style. During this first era of fisheries management in South Africa the right to participate was effectively removed from the fisher. White interests could more easily be controlled and entrenched by targeting the capital intensive, and generally monopsonistic side, of fishing operations. The balance of power to control the TAC remained in monopsonistic hands through the Diemont Commission (1986), the Fisheries Policy

Development Committee (1994 to 1998), and the Marine Living Resources Act (from 1998) and was firmly entrenched after the 2001/2002 policy development process and medium term quota share allocation round.

With the recognition of South Africa's EEZ during 1977, the next stage in the development of fisheries management in South Africa (or the second era) was the design and implementation of quota management systems for the TAC fisheries. The initial development of these systems and individual quota distributions in all the TAC fisheries during the period 1978 to 1990 followed a number of similar criteria. Initially, the fisheries were considered closed to new entrants, but the Minister of Environmental Affairs embarked on a project to broaden access by redistributing a portion of the TAC to new quota holders, usually fishers. The historic participants fought this redefinition of the right to participation and the redistribution of a portion of the quota share previously held by them. This led to the establishment of the Diemont Commission in 1986 to enquire essentially into these and other issues on the design of fishing rights.

Perhaps the most visible outcome from the Diemont Commission was the removal of the powers of the Minister to determine the distribution of quota shares. This function was delegated to an independent Quota Board established in the Sea Fisheries Amendment Act of 1988 and instituted in 1990. The Quota Board sat and redistributed quota shares on an annual basis until the newly formed Fisheries Policy Development Committee was formed in 1994. A more racially representative Interim Quota Board fulfilled the functions of the Quota Board until a new fisheries policy was decided upon or a new legislation enacted. Finally, after the passing of the Marine Living Resources Act in 1998, the Interim Quota Board was disbanded and power to distribute the TAC again reverted back to the Minster of Environmental Affairs and Tourism.

In a precursor to the third era in fisheries management, the most fundamental proposition brought forward by the Fishing Policy Development Committee, which sat between 1994 and 1996, was to adopt, in line with other important fishing countries around the world, a market solution to the fisheries management problem. Redistribution and empowerment was expected to be rapidly achieved through a

private 'quota holding' company that leased quota shares to deserving individuals from historically repressed racial groups. The newly enacted Marine Living Resources Act of 1998 created the institutional structures for the proposed market solution, but at the discretion of the Minster of Environmental Affairs and Tourism. The redistribution and empowerment function was delegated to a new organizational form called the Fisheries Transformation Council.

In addition, the institutional changes in fisheries legislation led to a change in the function and purpose of the advisory bodies and increased the ability of MCM to levy the fishing industry. These institutional changes also resulted in an organizational change of the fisheries authority. The organizational structure of MCM assimilated the old Sea Fisheries Research Institute along with non-fishing research, coastal management, policing functions and coastal structures (fishing harbours). After the failure of the Fisheries Transformation Council, the redistribution and empowerment functions were also assimilated into the organisational structures of MCM.

Basically MCM was now faced with many new functions that did not previously fall into their core competencies (mainly which included marine science, administering a relatively small pool of fishing companies and collecting a research levy). Fundamentally, however, the institutional failure of the Fisheries Transformational Council and the subsequent assimilation of the redistribution and empowerment objectives resulted in the organizational failure of MCM. In an attempt to correct for this organizational failure, MCM embarked on a process of redefining its design of fishing rights, its distribution policy and its administrative structures.

After broad consultation it i) reemphasized a market solution to the design of individual fishing rights, ii) proposed a short redistribution and empowerment phase supposedly assisted by the market and iii) re-established a type of apolitical Quota Board by creating an external verification unit and an objective (also external to MCM) adjudicating body. Currently MCM is concerned with the trade-off between entrenching existing inequalities and the re-capitalization of the fishing fleet through the awarding of long-term rights. On balance, no fundamental changes have occurred since the time of the Diemont Commission in 1986. Surprisingly, MCM also believes it can achieve its redistribution and empowerment goals within four years by relying

on market forces. The next two chapters provide a formal framework from which to analyze the policy criteria described in this chapter.

CHAPTER THREE
SUSTAINABLE USE, PROPERTY RIGHT REGIMES AND THE FISHERIES MANAGEMENT PROBLEM

3.1 INTRODUCTION

The institutional and organizational evolution of South Africa's main TAC fisheries was outlined in the previous chapter. The aim of this chapter is to put fisheries management in South Africa into a more global context. Fisheries management around the world is first about the evolution of the property right regimes, primarily resulting from population growth and economic development. Population growth, according to North (1978, in Pejovich 2001a:95) results in factor shortages and increased demand for food, leading to technological innovation. In the case of fisheries, technological innovation means more efficient fishing, lower harvesting costs, and a consequent pressure on the regenerative capabilities of the natural environment. As pressures on the environment increase, property right regimes change ultimately to protect the economic interests of fishers (and also to protect the environment).

Four broad groups of property regimes (open access, state property, common property and private property regimes) are used to illustrate the evolution of economic thinking on the fisheries problem, fisheries policy and fisheries management. For the purposes of explanation, a simple bioeconomic model is used to demonstrate the effect that the various property right regimes have on balancing economic efficiency and sustainable resource use. Following this is a discussion on the development and evolution of the literature, international institutions and country-specific responses to the fisheries problem, is addressed with the aim of placing the South African situation into context. The assumptions made with regard to dealing with a complex fisheries management problem are then presented. Finally, a broad discussion is presented that deals with the various revenue collection options and instruments available to contribute to, at least some, of the costs of the South African fisheries management system.

3.2 TAXONOMY OF PROPERTY RIGHT REGIMES

The concept of property rights in natural resource systems is first made more useful by means of a grouping structure, or systems of regimes. The four broad property right regimes have been in existence since Roman times (Pejovich, 2001a:xviii) and extend across cultures, religions and philosophical traditions [see for example, McChesney (1990), Ahmad (1994), Stahl (1997) and North (1998)]. Hanna (1996:4), however, correctly points out that property right regimes, particularly with regard to natural systems "...comprise an almost infinite spectrum from open access to private property." Many authors (for example, McCay and Acheson 1987, Berks 1989, Ostrom 1990 and Bromley 1992) provide categorizations of property right systems. The most useful and generally accepted taxonomy used for explanatory purposes in the natural environment is attributed to Bromely (1992) and is illustrated (after Hanna, 1996) in table 3.1 below.

Table 3.1: Taxonomy of property right regimes applicable to commercial marine fisheries.

Regime type	Owner	Owner rights	Owner duties
Open access*	None	Capture	None
State property	Public	Determine rules and distribute	Maintain social objectives and constrain rates of use.
Common property	Collective	Exclusion of non-owners	Maintain and constrain rates of use.
Private property	Individual	Socially acceptable uses: control of access	Avoidance of socially unacceptable uses.

Source: Adapted from Hanna (1996:4)
*: Open access is not in the strict sense a property right regime

Table 3.1 shows the different property right regimes that occur in the world's fisheries. The table links the type of regime to the rights and duties of the owners of the living marine resource assets. They essentially deal with i) the ability of asset owners to exclude others from the benefits and to create rules on the distribution of

benefits among a defined group and ii) the duties associated with ownership usually dictated by social norms and standards.

The fundamental elements of property right regimes, however, may be viewed as the linking of economic and legal rights, and the ability to exclude others from the benefits or services of an asset. Economic rights are "...the ability to enjoy (directly or indirectly) the services of assets" (Barzel, 2002: 35) whereas "...the claims over assets delineated by the state as the property of particular individuals or institutions" (Barzel, 2002:157) are legal rights. For example, one might not have a legal right over an asset, but may enjoy substantial benefits (or costs) from its existence—the typical problem of externalities. When a legal right is linked to an economic right there are inevitably the duties associated with these rights. With regard to living marine assets:

a In an open access regime, all individuals and institutions have economic, but no legal, rights to the services of the natural asset. There are no exclusion rules. No single individual or organization has any duty to conserve the resource.

b Under state property, both economic and legal rights to living marine assets are held by the state in custodianship for the general public. In commercial fisheries, the responsibility of the state is the distribution of legal rights to a selected group of economic agents. The state establishes and enforces the rules of the legal rights.

c A definable group holds both legal and economic rights to a living marine asset in a common property regime. The institutional framework providing the rules of distribution, use and exclusion is usually the responsibility of the community.

d Where it is possible for an individual or private organization to hold both economic and legal rights, a private property regime exists. For this to be possible the asset must display typical private good characteristics, that is, it must be both rival in consumption and excludable (Cullis and Jones, 1992:60-63).

In the traditional economic sense, open access and private property right regimes exist where the natural asset and its services have either dominant public or dominant private good characteristics respectively. State and common property regimes exist

where the excludability of the asset is difficult, but the services from the asset may be rival (Paul, 1985:43). The distribution of legal rights usually is determined in the politico-economic, or public choice, arena or by the institutional framework of the relevant community. The following sections cover the four regimes illustrated by the simple Gordon (1954) bioeconomic model, with particular reference to the commercial fishery

3.3 THE GORDON (1954) BIOECONOMIC MODEL

Essentially, bioeconomic models convert biological population growth models into total revenue functions by applying appropriate prices for each level of output or harvest. To illustrate using the most basic example (after Gordon, 1954), the harvest function is modelled on a lumped parameter logistics population growth model[1]. This is usually represented in analytical form as $f(x) = rx(1-x/K)$, where $f(x)$ is the growth of the resource (usually measured in biomass); r is the intrinsic lumped growth parameter including recruitment (successful birth), natural growth and natural mortality; x is the sustainable yield of the fishable biomass and K the natural equilibrium population size. With harvesting, $h(t)$, the sustainable yield of the biomass is the growth of the biomass less the harvest. Thus, for each level of harvesting there is a corresponding sustainable yield, namely $x = f(x)-h(t)$. The sustainable yield function is converted to a total revenue function by multiplying each level of sustainable yield by the relevant empirically determined prices. Assuming a perfectly elastic demand (constant prices), the logistics function yields a bell-shaped total revenue function.

Total costs are estimated usually using fishing vessel costs or catch per unit effort data. A profit-maximizing level of output is determined by an unconstrained optimization, that is, where marginal cost is equal to marginal revenue. Figure 3.1, below, illustrates the marginal and average conditions of the simple Gordon (1954) bioeconomic model. For the sake of clarity, the cost function is assumed to be linear

[1] The natural population grows exponentially when food and space (a lumped parameter) are readily available but the rate of growth slows down as competition for food and space increase until stable population size is reached within the carrying capacity of the environment—this produces a bell-shaped growth curve [for example, Graham (1935) and Schaefer (1954) in Caddy (1999)].

giving a flat marginal cost curve (MC) that directly coincides with the average cost function (AC). This gives a standard marginal revenue curve (MR) with a slope exactly half of the average revenue function (AR). Also note that, as the level of catch or output increases, the size of the population must necessarily decrease.

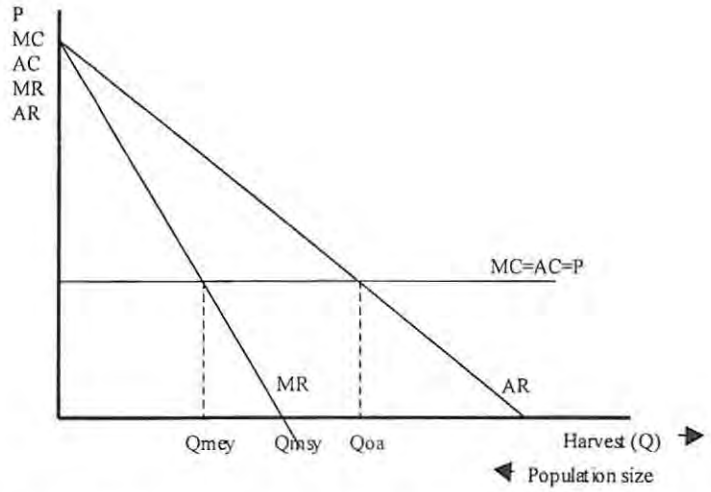

Figure 3.1: The marginal conditions of the Gordon (1954) static bioeconomic model.
Source: Gordon (1954).

With regard to figure 3.1,

a. If access to the fishery is unregulated an amount of Q_{oa} will be harvested. Fishers will catch fish until the cost per unit (AC) is just equal to the average revenue per unit (AR). It stands to reason that if the costs of capture are low and if the fishery is unregulated, the resource is in danger of being exploited to extinction. Although this is illustrated where AR=0, in reality due to schooling behaviour in fisheries, extinction may also appear with a relatively high average cost. For example, if the distribution of fish in the ocean is not homogenous—most fish display schooling behaviour—the resource may be harvested to extinction in an open access situation with positive average costs.
b. The level of output or catch at the biologically determined maximum sustainable yield (MSY) is at Q_{msy}. In other words, with constant prices the MSY occurs where total revenue is maximized, that is, where marginal cost is equal to zero (MC=0). This only holds with constant prices, otherwise MSY is where the sustainable yield from the logistics function is highest, that is, the marginal sustainable yield is equal to zero.

c. The constrained optimization point solves for a profit, or rent, maximizing level of output or catch, Q_{mey}, where the cost of the last unit caught (MC) is just equal to the revenue received from the last unit caught (MR). This solution is called a maximum economic yield (MEY). At this point and in a static partial equilibrium sense, resource rents from the fishery are maximized and inputs into the fishing process are allocated efficiently.
d. In this type of bioeconomic model the MEY is always below the MSY for positive costs.

The stark simplicity of the model brings out a vital point in fisheries management. When catch, or effort, is not limited, too many firms in the form of fishing vessels will enter the fishery. This leads to too much capital and labour allocated to the fishery and an overexploitation of the resource—referred to as over-capacity or overcapitalization in the fisheries literature (Munro & Scott 1985, Bjorndal & Munro 1999 and FAO 2000).

What is made clear from the simple bioeconomic approach is that:

1. Commercially viable living marine resources may need to be restricted.
2. Allocative efficiency dictates that an attempt is made to set total catch or effort below the maximum sustainable yield.
3. Due to environmental and economic uncertainty, the goal of allocative efficiency is an elusive one: it makes more sense to minimize the effects of overcapitalization.

Recognition of the above, including technological and environmental factors—for example, fishing method restrictions, incidental catch, schooling and migratory behaviour of fish, data uncertainty and equity issues relating to competing fishing firms—resulted in the establishment of a precautionary approach to fisheries management (Caddy, 1999:26). From a total catch or effort point of view, this means setting MSY on the conservative side of the risk distribution, closer to the MEY. Without due care bioeconomic analyses coupled with the precautionary approach may show a tendency to ratchet down the total restricted catch or effort. Also of concern, is that fish populations tend not to be homogenously distributed—they move together in schools. Thus, the marginal cost of capture may be underestimated, making the management of resources using the bioeconomic approach more prone to resource failure (extreme over-exploitation). The major purpose of this sub-section, however,

is to use the simple bioeconomic model to illustrate the logic of various important property right regimes encountered in commercial fisheries. With this in mind, a clearer summary explanation on the development of fisheries economics, fisheries policy and fisheries management is possible.

3.4 OPEN ACCESS

Up until the 20th Century, open access to the exploitation of marine fisheries was considered appropriate. Scott (2000:1-3) points out that monopolies were formed to protect local fishers by restricting access to national fish markets, but "...the 17th Century freedom of the seas doctrine supported the 13th Century national public right of fishing doctrine. There was no argument for an individual to own fishing property rights nor for government to have power of regulation" Scott (2000:3). The harvesting capacity of the world's fishing vessels (probably consisting mostly of micro to small vessels) was not sufficient to maximize resource rents from the entire fish population. This is illustrated in figure 3.2 below.

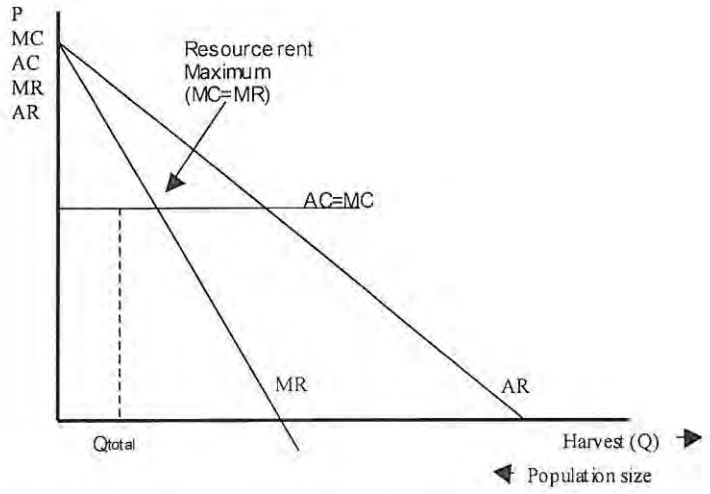

Figure 3.2: The Gordon (1954) static bioeconomic model of open access and fishing under-capacity.

In the static bioeconomic model, figure 3.2, the total harvest of each particular species (Q_{total}) is not sufficient to reach a bioeconomic profit maximizing point (where MC=MR). This would occur even at a relatively high marginal cost as a result of factor shortages in this case labour (North, 1978:97 in Pejovich, 2002a).

Although Huxley (1884) stated that probably all the great sea fisheries are inexhaustible by the late 1800's fishers claimed that many fisheries were over-exploited (Scott, 2000:3). Harvesting of valuable species by increasingly large groups of fishers using progressively more sophisticated capture equipment results in increased catches. As the capacity to harvest rises over the years and marginal costs decrease through better technology and lower factor costs, total harvest will expand first in the near-shore micro to small vessel fisheries, then moving outwards to sea with progressively larger vessels as technology and demand thresholds change through population pressure, in a manner similar to that described by Yandle & Morris (2001:131). This scenario is illustrated below in figure 3.3.

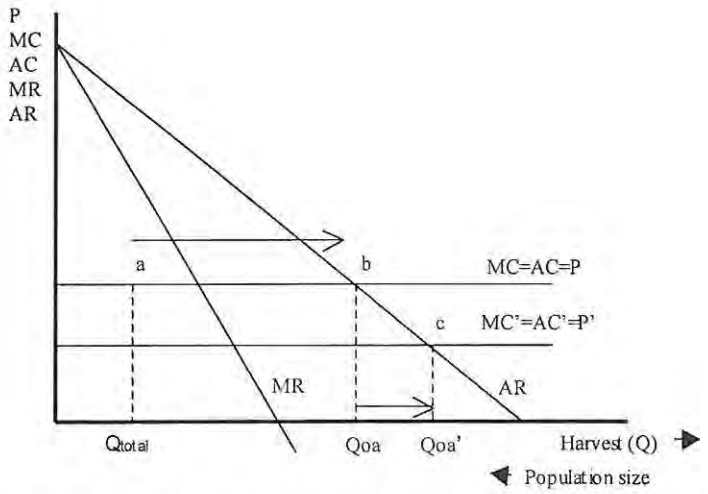

Figure 3.3: The Gordon (1954) static bioeconomic model and an open access solution.

As has been previously stated, the open access solution occurs where AC=AR. Figure 3.3 above shows that from a position of fishing under-capacity, for example at point 'a', the harvest will increase in response to higher demand thresholds (assuming constant costs) to a level where AC=AR, at point 'b'. With, for example, technological advance and possible economies of scale (a fall in the marginal costs of fishing) in response to the above characteristics, larger quantities of marine living resources will be harvested in an open access situation (from, for example point b to point c or, Q_{oa} to Q_{oa}). In an open access situation, because fishers exploit until AC=AR, problems of overexploitation and overcapacity result, starting with the micro

and small vessel fisheries and moving outward (from the sea-shore) to the large vessel fisheries. The next section illustrates the issues facing the management of fisheries under a state property regime.

3.5 STATE PROPERTY REGIMES

The logic of converting an open access regime in fisheries into a state property regime is that the institutional framework of a country allows the government to determine the rules, regulations, distribution and restrictions on the use of these natural assets. Yandle & Morris (2001:129) make the distinction between public property, for example a national park, and regulatory property where user rights are allocated and regulated by government—in this thesis state property is equivalent to the Yandel & Morriss (2001) regulatory property. The choice of rules that govern both the form and structure of user rights, in the allocation of user rights by the state, is discussed in detail in chapter 4. Within the bounds of this discussion, however, economic rights present in the open access situation have to be ratified by legal rights determined by the state. For the purpose of clarity and consistency the above logic is illustrated using the Gordon (1954) model below.

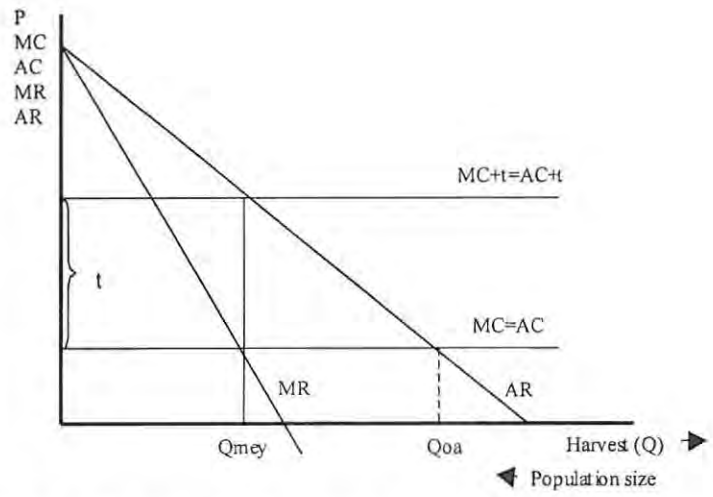

Figure 3.4: The Gordon (1958) model and the state.

If the state's objective is based on a static partial equilibrium notion of economic efficiency (see section 2.2) then it would want to restrict harvest to the maximum

economic yield[2] (an output of Q_{mey} determined where MC=MR on figure 3.4). To implement this the state has a number of important policy instruments at its disposal, with regard to figure 3.4 the most important being i) the imposition of, for example, a unit tax 't' or ii) it can limit output to Q_{mey} by regulating the effort expended in fishing (an effort quota or total allowable effort) or iii) by setting a catch quota, in the form of a TAC, at Q_{mey} or iv) a combination of these.

The choice in determining what policy instrument to use, effort and catch quotas or price (tax) controls is determined by the brittleness of the system. The brittleness of a system, first formally studied by Weitzman (1974), is a measure of the welfare loss from a price control to the welfare loss from quota control when some important *a priori* information is missing to the planner. In the face of some missing information, a system is brittle if welfare loss from price control is larger than that from quota control—this obviously is dependent on the relative elasticities inherent in the system. The brittleness of the system is most simply illustrated, after Milgrom & Roberts (1992:95-99), by assuming for the fishery i) a normal upward-sloping linear marginal cost function (MC), ii) a downward-sloping linear marginal benefit function (MB) or demand function, iii) the desired level of output is determined at maximum economic yield (Q_{mey}), and iv) that the planner can measure accurately the marginal benefit function (demand curve) and knows the slope of the marginal cost function but not its intercepts. In other words, one piece of information is removed from the planner, for example the planner underestimates the costs of fishing 'MC^{est}'. The best choice available to the planner is illustrated in figure 3.5 below.

[2] In fact, it is a state monopoly situation.

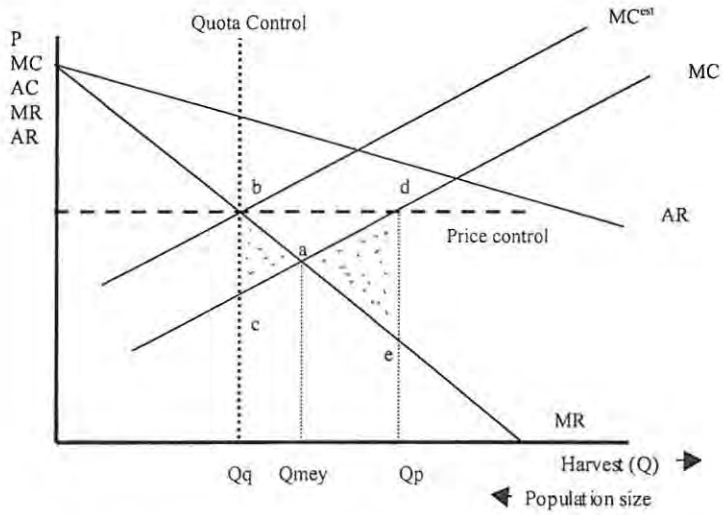

Figure 3.5: Brittleness and the Gordon (1954) model.
Source: adapted from Milgrom & Roberts (1992:95-99)

With respect to 3.5, the maximum economic yield is set where the MR(MB)=MC at Q_{mey}. If the planner underestimates the costs of fishing (MC^{est}), the welfare loss from setting a quota control is equivalent to triangle 'abc' and from price control 'ade'. The system is, in the above example, brittle (triangle 'ade' is larger than triangle 'abd') and quota control will result in lower welfare losses than price control. The result, however, depends on the relative elasticities of the marginal benefit and marginal cost functions.

Seemingly, regardless of the brittleness of fisheries systems, the conventional wisdom in fisheries management has and still does favour harvest quotas over unit taxes (or landing fees). Probably, the primary reason is that up until the late 1970s fisheries policy formulation was dominated almost entirely by biologists, who still have considerable influence (Wilen, 2000:309). It makes more sense to worry about the stock collapsing by imposing a simple quota based system than trust in the arcane workings of the manipulating the price system through unit taxes, particularly because it requires large additional 'economic' information to do the same thing. Recently, this debate reemerged. Weitzman (2000:13) argued that, according to his model with environmental uncertainty, the results favour unit taxes (specifically landing fees) over harvest quotas. In response, Arnason (2000) and Jaeger (2000) responded that i) the massive design problems inherent in managing a fishery, not accurately captured in Weitzman's (2000) model, ii) the corresponding large informational requirements

and iii) the risk of misestimating prices still warrant the more cautious approach of quota management.

Also of note is that the maximum economic yield, whether it is calculated using fishing costs as in the above or a capital theoretic approach using discount rates applied to the fish stock as natural capital, always (except where costs or the discount rate are zero) falls below the biologically determined maximum sustainable yield. Further, the cost based solution proposes to maximize resource rents and factor efficiency (in terms of the mix of fishers and fishing vessels given the size of the fishery) by treating the fishery as a state monopoly where in fact most fisheries operate with a number of competing fishing firms or fishers who face world markets. However, it is true that many fishing firms exploiting the same fish population characterize most commercial fisheries. This translates to the fact that when declaring a marine fishery state property, a common property regime is likely to emerge when the private sector is involved[3].

3.6 COMMON PROPERTY REGIME

For the purposes of this thesis, a common property regime[4] is defined when both economic and legal rights, and duties, of a public or quasi-public good are restricted to a community or group of individuals. Non-members of the group are usually excluded. The community's informal institutions—or socially defined rules, regulations and conventions within the group—will determine the rate at which the resource is exploited and how outsiders are excluded from using the resource. In the case of the commercial fishery, formal institutions—laws, regulations and a TAC defined outside of the group—govern the rate or absolute amount of the resource used, how the rules are implemented and enforced. This system, however, might not be stable as it is difficult to observe fisher behaviour while at sea.

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[3] Obviously in the previously centrally planned economies this does not hold.

[4] Open access is often confused with common property regimes. This may be attributed to Hardin's (1968) Malthusian popularisation of the term by attempting to draw an analogy between common grazing lands in pre 20th century Britain (common property) and family size in America. His thesis was to prompt Congress to restrict family size in the USA—a solution controversially adopted by the Chinese.

The situation where the state (through research and enforcement of agreements) and the fishers act together to determine the institutional framework is called the co-management of marine fisheries. Co-management solutions to fisheries management, which attempt to compromise between formal and informal institutions, are currently becoming more popular. Although this state of affairs is a simplification and is prone to the same cheating problems in any cartel-like situation, it does provide some insights into the common property solution expected in the commercial fishery. This is illustrated using the Gordon (1954) bioeconomic model with increasing costs below.

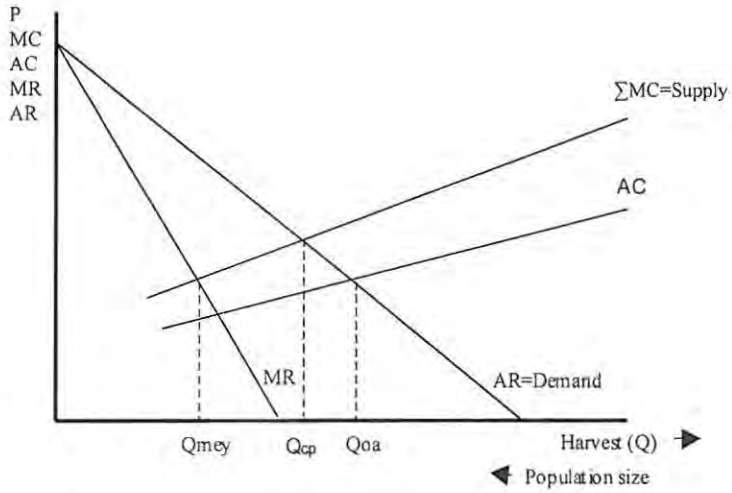

Figure 3.6: The Gordon (1954) model with rising costs and common property.

Providing there are good community rules that govern resource use and an ability to enforce them, the common property solution provides the closest approximation to a normal competitive market solution. With reference to figure 3.6, fishers in a common property regime will harvest at the socially optimum level at Q_{cp}, that is, where the sum of the marginal costs (supply) is equal to the average revenue (demand). The level of harvesting is lower than the open access solution (Q_{oa} where AC=AR) and higher than the state monopoly solution 'Q_{mey}'.

3.7 PRIVATE PROPERTY REGIME

Private property rights regimes occur when the relevant goods "...can be parceled out among different individuals" (Samuelson, 1954: 387), consumption is rival and other

users or consumers can be easily excluded. Private property right regimes are only efficient when all costs and benefits are internalized, that is, the goods and services show strong private good characteristics. Generally, fishing vessels and other harvesting gear display obvious private good characteristics and are privately owned. Further, providing that the fisher holds the relevant user rights, captured fish are rival and excludable. However, in a fisheries situation where fish are not visible prior to capture (ownership over specific fish is not easily demarcated), but users can be excluded, a private property regime can only exist with a monopoly right to use the resource.

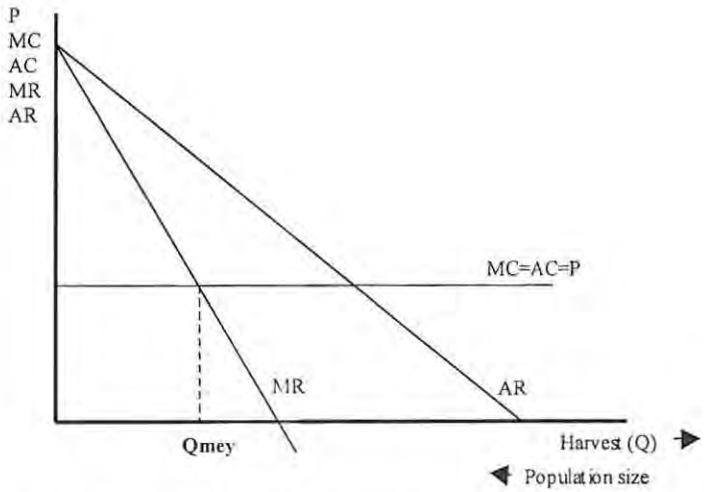

Figure 3.7: The Gordon (1954) model, a private property regime and the maximum economic yield.

If the fishery as a whole is treated as a single firm, either through an enforceable monopoly right or a state monopoly, a profit-maximizing level of output is derived at the maximum sustainable yield. With many fishing firms, however, a private property regime cannot easily exist: enforceable group rules are necessary and this gives rise again to a common property solution. With enforceable rules and a compliant fishing population, common property solutions can mimic the private property solution. The trend, however, would be towards a larger sustainable harvest than the maximum economic yield.

The advantages of private property for economic efficiency, within a private property regime, have been well documented (Pejovich, 2001a&b). Marine living resources are

not easily excludable and are difficult to demarcate geographically—private property regimes are difficult to implement. However, certain advantages can be realized by harnessing the advantages inherent in a private property regime. When a fishery is transformed from an open access regime to a state property one, the state usually allocates individual user rights to specific fishers. Essentially this creates a common property regime. However, by giving the individual user rights with certain private good characteristics some of the advantages from a private property regime can be realized. In this situation, the state designs the form and structure of the individual fishing rights, allocates these rights to deserving individuals, enforces compliance with the duties associated with the right and excludes those without a right of participation (see chapter 4 for details).

3.8 PROPERTY REGIME TRANSFORMERS

Institutional arrangements can be used to transform a property regime from one form to another. In the fishery these property regime transformers are used as tools to reduce the costs of stock failure (the fishery collapsing due to overexploitation). Open access regimes are converted into state property regimes usually by international institutional arrangements. If there are more than a few users, or the state cannot easily (the costs are too high) impose a solution similar to a state monopoly, the state property is converted into a common property regime. In a common property regime, the formal and informal institutions determine the rate at which the resource is used. Individual fishing rights may, for example, be devised in such a way that they mimic the results of a private property regime and provide a partial solution to shared resources under the former three regimes. Finally when the fish are captured, and provided that the individual has the right to harvest, they are converted from a resource under a common property regime or state property regime or open access situation into the realms of a private property regime. The processing and marketing of fish and fish products are accordingly subject to a private property regime.

3.9 THE FISHERIES MANAGEMENT PROBLEM

3.9.1 Introduction

The purpose of this section is to illustrate the path of transforming the ocean and its resources from an open access situation to a state property regime and then another conversion to either a common property regime (limited entry programmes) or a partial private property regime (by instituting a system of quota management and transferable individual fishing rights) or a mixture of both. Initially, the property regime conversions were only necessary in the near-shore micro to small vessel fisheries that are characterized by low costs and easy access. These were usually transformed into an eventual common property regime characterized by limited entry programmes. As the capacity to harvest greater quantities grew with economies to scale in deepsea fishing, so the need to extend the state property regimes further into the higher cost medium to large fisheries emerged.

By the late 1970s most fishing nations had successfully extended their exclusive economic zones (as state property) to 200 nautical miles from the shore. These nations were now faced with either fishing fleets that were too small and thus they had to expand the national capacity to harvest their resources, or they were faced with too many fishing vessels as their fleets returned to home waters and had to reduce capacity. Now, under a fundamental state property regime various methods of managing the world's fisheries were proposed and adopted. This section outlines some of them and provides some case studies from the North American fisheries, the Nordic countries, Australia and New Zealand and from some fishing nations that earlier underwent an economic transition to market economies, namely Russia, Estonia and Chile.

3.9.2 Partially Solving the Fisheries Management Problem

As has already been stated, from as early as the late 1800s fishers started to complain that many of the fisheries were overexploited. Caddy (1999:7) points out that, during 1902, the over-fishing committee of the International Council for the Exploration of the Sea (ICES) was inaugurated and shortly afterwards the first integrated theory of fishing was developed. This course of events led to the Hague Conference for the Codification of International Law in 1930 which gave rights to coastal states to claim

territorial sea up to three nautical miles from the shore, while maintaining freedom of the high seas (Stokes, 2000:108).

Up until the 1950s policy inputs into fisheries management from the economic world were absent and due to the advancement of the biological fish stock assessment methods the "...choice[5] was therefore made to base assessment and management on the ICES biological sciences" (Caddy, 1999:6). In fact, the development of surplus production fish assessment models, from 1935[6] onwards, created a broad and sufficiently general approach to apply to most fisheries and "...provided the only target reference point to be referred to in the Law of the Sea Convention", (Caddy, 1999:6). This general approach to fish population dynamics also gave rise to the first bioeconomic models of the open access fishery, namely Gordon (1954).

The bioeconomic literature developed along neoclassical lines[7]. Briefly, Smith (1968) modelled, using a generalization of Gordon's (1954) approach, the dynamic entry and exit of fishing firms in response to the distribution of resource rents. The dynamic optimization solution to entry and exit, however, was only developed later (Smith, 1969). Starting with Scott's (1955) view of the environment as a capital theoretic dynamic path, bioeconomics as a capital theoretic problem developed further [Brown (1974), Clark & Munro (1975), Clark (1985) and Clark (1990)]. Later, Spulber (1985), for example, included economic and environmental uncertainty into bioeconomic models that solve for time invariant probability distributions of harvest levels, illustrating that the efficient allocation of factor inputs is not necessarily achieved at MEY.

The growth of the bioeconomic body of theory led to a policy debate between biologists and economists. Biologists argued the sense of maximizing physical yield, or maximum sustainable yield (MSY), where economists argued for maximizing an

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[5] In the North Sea, but the advancement of these models was to provide solid evidence for over-fishing and the need to regulate them as well as providing a target for the first time as a maximum sustainable yield.

[6] Caddy (1996:6) attributes the first surplus production model in 1935 to Graham and then Schaefer in 1954.

[7] An interesting, although trivial, fact is that the mixing of these biological population dynamic models with an early neoclassical approach to economics has led to a change in the definition of Ichthyology, namely "...the study of the physiology, history, economic importance, etc., of fishes." Collins English Dictionary (1995).

economic yield or a maximum economic yield (MSE)[8]. According to Wilen (2000:309) the discrepancy between the opposing lines of argument is based on discipline-specific fundamentals. Biologists defined the policy problem as one of excessive fishing mortality, best addressed by retarding gear efficiency, while the economists viewed excess harvesting capacity (too many fishing vessels) and a lack of established property rights (usually in the form of state property) as the major causes of economic inefficiency. Wilen (2000) reports that the policy debate up until the late 1970s, especially in the North Atlantic fisheries, "...is a long case study of frustration and essentially unsuccessful attempts to regulate in a fundamentally open access setting...[because]...it was difficult...to muster support for the idea that employed fishermen were somehow redundant, and, given that the participants were at least earning livings, it did not seem compelling to worry about excess effort as it did to worry about whether the biomass was in danger of collapse" Wilen (2000:309). Carr (1998) provides a summary of the debate between biologists and economists in the USA.

Before 1976, most coastal states had regulations and limited entry programmes particularly with regard to their inshore fisheries. The micro to small vessel fisheries, which are characterized by easy access (being near to the shore) and low costs, were the first to be regulated. The institutional arrangements protecting as state property the territorial rights of fishing countries which extended from three nautical miles in 1930, to five nautical miles in 1958, to 12 nautical miles in 1960, impacted largely on these fisheries. Most of the medium vessel and large vessel fisheries, however, operated in international waters with no restrictions on entry (an open access situation). The massive fleets built by a number of fishing nations from the 1950s (Wilen, 1999:307) left the deepsea fisheries with a mounting over-exploitation problem and with an excess of fishing capacity (large deepsea vessels).

From a micro to small vessel fishery point of view, the following examples from some fisheries in the important fishing nations (New Zealand and Australia, Norway and Iceland and Canada) and South Africa give an indication of state control in the

[8] As is stated earlier in the chapter, except in the case of zero costs or a nil discount rate, the MEY is always set below the MSY.

near-shore and inshore fishing zones. First, to restate from chapter 2, South Africa regulated its west coast rock lobster fishery, with a closed season in 1895 (RSA, 1986a:31) and although the state did impose an export quota it did not limit entry during this period. The abalone fishery was restricted by a size limit in 1953 and limited entry programmes the year after (RSA, 1986a:43). Second, the New Zealand fisheries, according to Memmon and Cullen (1992:156-157), were up until the 1970s a small-scale industry characterized by a large number of owner-operated small vessels. Entry limitations were first introduced in 1937 (in response to fears of over fishing) and relaxed again in 1963. Third, the Australian southern zone rock lobster fishery (Tyrer, 1995:40) and the Tasmanian rock lobster fishery (Phillips et al, 2002:460) were both managed from the late 1960s by limited licensing (entry) programmes. Fourth, in 1941 Norway instituted, 'the fishermen's register' which gave "The right to exploit the Norwegian fisheries resource...exclusively to fishermen" (Williams & Hammer, 2000:194). However, provided one was registered with the 'fisherman's register', access was unrestricted. The inshore fisheries with smaller vessels were only limited in 1983 (Mikalsen & Jentoft, 2003:399). Fifth, Arnason (1993:203) illustrates that in Iceland the nephrops, shrimp and scallop fisheries are well-defined inshore fisheries, which between the 1960s and 1970s were subject to local entry restrictions (effort limitation). Vessel quotas were introduced between 1973 and 1975. Sixth, limited entry programmes were introduced in the Canadian fisheries in the late 1960s, namely, the Atlantic Maritime Provinces rock lobster fishery in 1967 and the British Columbia Pacific salmon fishery in 1969 (Bodiguel, 2000:1).

The larger vessel fisheries, however, existed in a state of mounting crisis as the open access regimes persisted. The post World War II shipbuilding boom from the 1950s to early 1970s resulted in "...nations such as the Soviet Union, Japan, China, South Korea, and Poland buil[ding] huge trawl fleets to fish the world's stocks" (Wilen, 1999:307). Expansions of coastal state property (the territorial waters) to a final 12 miles in 1960 did not provide the necessary institutional framework to regulate the fisheries targeted by large factory vessels from all around the world. For example, the arrival of foreign fishing vessels into the South African large vessel deepsea hake trawl fishery in the early 1960s brought it into crisis within 10 years (Bross, 1999). From 1952 to 1976, Iceland fought four cod wars with England (Gissurarson, 2000:1),

Japanese factory ships mined the salmon waters of the Northwest Pacific (Schieder & Carr: 1998), Japanese and Australian vessels exploited bluefin tuna inside the Australian 200 nautical mile zone (Campbell et al, 2000:110) and because of the multi-country exploitation of the Arcto-Scandian herring stock, it collapsed in 1968 (Flaaten et al, 1995:343).

Against a background of developing countries failing to display the expected economic growth in the 1950s and 1960s (Todaro, 1997), early attempts in the 1970s to model systems with limits to long-term growth prospects (Forrester, 1971) and its applications (Meadows et al, 1972) gave rise to renewed concerns on the environment and naturally occurring resources (including the fishery). Also, according to McEvoy (2000:3) most of the environmental Acts in the United States of America were passed between 1969 and 1976. The first was the National Environmental Policy Act, followed by the Clean Air Act, the Clean Water Act, the Endangered Species Act and finally the Magnuson Fishery Conservation and Management Act (McEvoy, 2000:3). It was during the United Nations Third Conference of the Law of the Sea (1973 to 1982)[9] that the USA passed its Magnuson Fishery Conservation and Management Act in 1976[10], which among other things enforced its 200 nautical mile territorial waters.

The economic interest in the environment was particularly evident from the early 1970s, with, for example, the starting of the Journal of Environmental Economics and Management in 1974, a special issue of the Review of Economics Studies in May 1974 and the publication of important contributions, for example, from Krutilla (1967), Dales (1968), Ayres & Kneese (1969), Darge & Kogiku (1972), Montgomery (1972) Arrow & Fisher (1974), Dasgupta & Heal (1979) and Solow (1974). From a fisheries point of view, because the USA's Magnuson Act insisted on an optimal exploitation of fish resources, it gave the economists an institutional foot in the door and is accordingly marked as a watershed in the literature (Wilen, 2000). After the USA enforced their EEZ, most fishing nations then managed to extend their territorial

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[9] This became an international convention, United Nations Convention on the Law of the Sea, in 1982 and became international treaty law in 1994.

[10] McEvoy (2000:3) states that this Act was one of the last of the environmental Acts passed in the 'New Deal' order in the USA between 1969 and 1976. The first was the National Environmental Policy Act, followed by the Clean Air Act, the Clean Water Act, the Endangered Species Act and so on (McEvoy, 2000:3).

waters to 200 nautical miles from the shore where (according to Bjondal and Munro, 1998:179) 90% of the world's wild marine commercial harvest occurs.

The issue adopted by fisheries economists from the early 1970s was, particularly in the large vessel deep-water fisheries, how to replace foreign fishing vessels with local ones while limiting entry to prevent an over-large domestic fleet. Limited entry programmes were used, which were implemented with some success in the smaller vessel fisheries. Fishers reacted to limited entry programmes by steadily increasing harvesting efficiency through technological advances—called capital stuffing. In response to 'capital-stuffing' arising out of limited entry programmes, two approaches were proposed. The first approach by Christy & Crutchfield in Anderson (1977) argued that gradually freezing entry, followed by capital reduction, for example using buy-back programmes to remove excess fishing vessels and various price incentives in the form of landing taxes and licence fees, would prevent further rent dissipation arising from increasing over-capacity and capital stuffing. The second set, put forward by Christy in Anderson (1977), proposed that over-capitalization and rent dissipation (which also results in over-harvesting) are symptoms of inadequate property right definitions in fisheries.

Essentially the property rights solution put forward that i) harvest limits, calculated on the basis of MSY or MEY, be established as a maximum yearly annual catch, called a total allowable catch (TAC) and ii) then divided up among individual fishers to create from a state property regime, a common property one. This became known as a quota management system (QMSs) with individual quotas (IQs). By making the IQs tradable, called individual transferable quotas (ITQs), allocative efficiency is theoretically achievable through mimicking of a private property regime. The logic behind this argument is that the price system established in the quota market will limit the amount of people fishing to the optimum number thus getting rid of the over-capacity while ensuring a sustainable harvest. This is not a unique solution; Dales (1968) first argued the sense of marketable water use rights in Canada, followed by Montgomery's (1972) proposals on marketable licences in pollution control.

In line with the new wave of international confidence in the price system, the idea of ITQs took off during the 1980s with many countries adopting the system in various

forms. Shotton (2002:45) lists New Zealand, Canada, Iceland, Australia, Chile and the USA as important fishing nations with ITQ systems. Controversies inevitably arose around the ITQ systems, initially with the 'right of participation' and allocation problem (Morgan, 1995). With limited catch programmes—quota management systems—and transferable quota shares, effective enforcement is a prerequisite (Copes, 1986). Proportional individual shares of the TAC, as opposed to fixed catch allocations, in tons, remove the possibility of adding new fishing interests and boats when the TAC increases during good years and the resulting over-capacity in bad years (reviewed in Munro and Pitcher, 1996). Furthermore, long-term rights, as opposed to one-year rights, resulted in better game theoretic solutions (Hanneson, 1997) to allocative efficiency and resource resilience.

However, ITQs failed to produce the expected results (Copes, 1986). For example, the practice of high-grading or discarding low-value species or small-sized fish to maximise total value from the TAC share made accurate data collection for stock assessment purposes difficult (Anderson, 1994 and Arnason, 1994). Other issues were, and still are, high enforcement and other costs (Wilen & Homans, 1994), distributional effects (Guyader & Thebaud, 2001 and Anderson, 1994), persistent over-capacity problems (Greboval, 2000) and the top-down approach (Jentoft, 1989). A renewed interest in co-management issues in a common property regime (Jentoft, 1989) and further analysis of private property regimes and institutions are gaining in importance [Johnson & Libecap, (1982), Grafton et al, (1996), Edwards, (1994), Lent, (1994), Young, (1999), Scott (2000) and Charles (2000)].

Also during the 1900s, Agenda 21 of the 1992 United Nations Conference on Environment and Development led to the formulation of a Code of Conduct for Responsible Fisheries. The document was adopted by the FAO on 31 October 1995. The purpose is to provide a non-mandatory framework for the "...conservation, management and development of all fisheries" (FAO, 1995). During 1999, with the world's fisheries still showing persistent over-capacity problems, the FAO adopted the International Plan of Action for the Management of Fishing Capacity (Greboval, 2000). The agreement for implementation of the United Nations Law of the Sea relating to straddling fish stocks and highly migratory species only comes into force

after 30 countries have ratified it. By 1999 only 23 countries had ratified the agreement (Stokes, 2000:110).

3.9.3 Examples from Fishing Nations

The examples of using state property regimes in fisheries management are drawn from the USA and Canadian fisheries, the Icelandic and Norwegian fisheries, the European Common Fishery Policy, the New Zealand and Australian fisheries and the Russian far east, Estonian and Chilean fisheries.

The USA's Magnuson Fishery Conservation and Management Act of 1976 established two important things: first, the 200 nautical mile limit and second, powers for the federal authority to manage its fisheries (Darcy & Matlock, 2000:96). This institutional development was particularly important in the Alaskan halibut and sablefish fisheries, which before 1976 were largely harvested by the Japanese. The Act effectively resulted in a conscious 'Americanization' of these fisheries which was more or less completed by 1988 (Smith, 2000:166). However, although many fisheries in the USA are managed by limited entry and quota management systems, Darcy & Matlock (2000:98) report that Congress viewed wide-scale restricted entry and quota management programmes as contrary to free market principles and refused to endorse them.

Burke & Brander (2000:151) assert that in Canada, fisheries management institutions evolved on a fishery-by-fishery basis and not as a focused national policy. This is not an altogether unexpected consequence. Significant advances come from Canadian commentators; most notable are the founders of fisheries economics, Gordon (1954) and Scott (1955). Also, an important characteristic of most institutional change in the various Canadian fisheries is that they developed in collaboration with, and with the support, of the majority of the fishers (Burke & Brander, 2000:151). In a nutshell, Burke & Brander's (2000) rendering of Canadian experience started by establishing groundfish (cod) catch quotas in 1960, limiting the number of fishing licences starting in 1967—later followed by all the important fisheries—and introducing individual quotas in 1980.

The Icelandic fisheries are usually divided into three distinct types, namely demersal (cod) fisheries, a pelagic or herring fishery and a near shore fishery harvesting nephrops, shrimp and scallops. Gissurarson (2000:1-16) outlines the Icelandic fisheries as follows:

a. During 1984, vessel harvest quotas with gear restrictions were introduced in the North Sea cod fishery. Vessel quotas were first allocated in amounts calculated from previously recorded catch. Between 1985 and 1990 a mixed system existed were fishers could choose between a two-year vessel quota or an effort quota (limiting the days allowed to fish). During 1990 all effort quotas were abolished and the vessel catch quotas became transferable.
b. Between 1972 and 1975 a moratorium on harvesting herring (pelagic species) was instituted in response to over-fishing of the species. In 1976 a global TAC was determined and divided up between operational pelagic vessels, thus creating an individual quota (IQ) management system. The IQs became transferable (ITQ) during 1979.
c. The nephrops, shrimp and scallop fisheries are well-defined inshore fisheries. Between the 1960s and 1970s these fisheries were subject to local entry restrictions (effort limitation). Vessel quotas were introduced between 1973 and 1975 and became transferable by 1997. During 1998 specific rules were established to discourage speculation in quotas.

Between 1973 and 1990 all Icelandic restricted entry fisheries management systems were changed to quota management systems. Transferable individual or vessel quotas were first introduced in 1986 and all quotas became transferable during 1997.

Williams & Hammer (2000:192-197) describe the Norwegian fisheries as follows. Fishing regulations were first introduced into Norway during 1908 by limiting trawls in Norwegian seas and limiting access by the compulsory licensing of trawlers in 1932. Although many fisheries are shared with other countries, they formed in Norway the backbone to rebuild coastal communities after World War II. Perhaps the most significant institutional landmark was the creation of the 'fishermen's register' in 1941 which gives "The right to exploit the Norwegian fisheries resource...exclusively to fishermen", effectively restricting access to those who own fishing vessels. This essentially created an input control system (vessel and gear limitations). Individual vessel quotas (IVQ) restricted by maximum harvest were later

introduced into the fisheries management system. Over-capacity is the most pressing issue in the Norwegian fishing fleets. In this regard a quota transfer system, designed to reduce the number of fishing vessels in the fleet, was introduced during 1984. It was expanded in 1990 and again during the 1996/1997 fishing season. Various vessel-decommissioning schemes were introduced beginning in 1979. Because ITQs encourage speculation in quota, this system was rejected outright in 1992 as it is in contradiction to the fundamentals of the 'fisherman's register'—the right to harvest fish is exclusive to fishermen.

The European Union (EU) declared a common EEZ in 1978, which became firmly regulated in 1983 (Smit, 1997:355). The initial distribution of the TAC for each species was based on the catch history of each nation during some reference period and on the basis of 'relative stability' is distributed as a percentage of the TAC to member states in each period (Morin, 2000:265). Although the split is supposed to take into account the particular needs of regions and local populations especially dependent on fisheries, the EU's legal framework, specifically the right of establishment and the free movement of workers, has led to what is called 'quota hopping' (Morin, 2000:267-271). Quota hopping occurs where a fishing vessel owned by one member state must be considered for a quota share in another. Morin (2000:273) further correctly asserts that tradable quota shares will worsen the adverse distributative effects of 'quota hopping'. More recently, the 2002 reform of the Common Fisheries Policy (as a result of a failing system) calls for greater stakeholder participation and co-management of the resources, decentralization (both of these criteria are meant to strengthen the claims of local populations dependent on fisheries), transparency, accountability, effectiveness and coherence (Gray & Hatchard, 2003).

Mirroring the protectionist and regulated New Zealand economy during most of the 20th century, its fisheries were highly controlled. During this period, Hersoug (2002:16-19) reports a concerted and cumulative effort by authorities to regulate the fishery but with little attention given to its development. The declaration of the New Zealand EEZ in 1978 gave the country sovereignty over the sea 20 times its landmass. However, both fleet capacity and expertise to harvest the deep-sea fish stocks had not previously developed (Hersoug, 2002:17). Later, however, various incentive schemes

during the early 1980s were used in an attempt to 'New Zealandize' the deep-sea fisheries. This led to excess harvesting capacity of the inshore fisheries—an increased number of small vessels. Also, in 1984 New Zealand embarked on a voluntary structural adjustment programme of rapid market liberalization. Coinciding with the macroeconomic strategy, the New Zealand fisheries authority began to liberalize fisheries management by using quota management systems (QMS) with transferable long-term quota shares. Although the reform process specifically included fishing industry participation, by 1990 there was a "Breakdown in the working relationship between government and industry." Kidd[11] (2000:136). During 1985, a parallel social movement occurred. The expanded mandate of the 1975 Treaty of Waitangi Act recognizing historic Maori rights—including fishing rights—to 1840, contributed to the conflict. New Zealand developed a sophisticated Maori fishery at least 800 years ago (Hersoug, 2002:15). The Maori claimed a significant portion of the rights to fish and by the time the Maori Fishing Act was passed in 1989 (Hersoug, 2002:68-69) the government authority[12] was forced to buy-back and redistribute a significant portion of the TAC.

The Australian fisheries, according to McIlgorm & Tsamenyi (2000:148-154), report that independent states are responsible for fisheries management and that by the 1980s most fisheries were managed by limited entry programmes. However, during the 1980s most fisheries experienced over-capacity problems which were approached in three different ways, namely, i) fishing effort controls through restricting certain vessel technologies, ii) buy-back programmes where the state and sometimes the private sector bought fishing vessels and removed them from the fishery and iii) quota management systems. Most concern and legal conflict occurred over the quota management systems and transferable individual quota shares (McIlgorm & Tsamenyi, 2000:149). Mostly the highly-priced living marine products, namely, 100% for abalone fishery, 56% of the long-line tuna and snapper fisheries, 54% of the

[11] Kidd was the New Zealand minister of fisheries between 1990 and 1996. His stated mandate was "...to get fisheries management out of the courts" (Kidd; 2000, 137), a problem he attributes to the reneging by previous government of an 'acceptance' clause in the new fishery act: when the TAC declines government compensates fishers for their reduction and when the TAC rises fishers pay for the additional TAC.

[12] The Maori Fisheries Commission was granted an initial 10% of all quotas and mandated to buy 2.5% per year over the following four years (Hersoug, 2002:69).

mass of the trawl fisheries, 43% of the pelagic purse seine fisheries and 29% of the rock lobster and crab potting fisheries ended up under transferable individual quota regimes (McIlgorm & Tsamenyi, 2000:149).

The Russian far east fisheries did not develop a transferable quota system. During the transition to a market economy some of the local fishing collectives (Kolkhozi), who previously had sole access to the relevant fishery, succeeded in transforming into viable private fishing companies (Johnson, 1996:132). However, in the large vessel fisheries external private businesses usually replaced the Kolkhozi with foreign capital and inter-industry agreements (Johnson, 1996:132). The companies apply for a portion of the TAC on a yearly basis (Johnson, 1996:132). Johnson (1996: 134-135) also provides an interesting account of allocating the TAC, which is done on a yearly basis and that seems to have some parallels with the South African system. Biologists from the Pacific Ocean Research Institute of Fisheries and Oceanography (TINRO) recommend a TAC to the Committee of Fisheries who then divide the TAC and allocate it to the different regions. Following this, fishing companies, as well as new entrants, can apply to the regional authorities for a share of the regional TAC. TINRO then charges the fishing companies a fee to conduct research into establishing the next year's TAC—in fact one TINRO branch formed a corporation which allocated research quotas to member companies which has led to charges of corruption in the Russian far east fisheries. Fishing capacity in the large vessel fisheries dropped as a result of fuel shortages, inability to replace harvesting and processing equipment, and lack of a processing infrastructure.

Transition in the Estonian fisheries resulted in the rapid privatization of the micro to small vessel fisheries. This is because of the small start-up fixed costs and the opening up of foreign markets for pikeperch, perch and eel to the European market, which eventually gave rise to over-fishing. (Vetemaa et al: 2002:96). On the other hand, Vetemaa et al (2002:96-97) explain that there were initially privatization problems in the medium to large vessel trawling fisheries, but this reversed as purchasing power in the eastern markets expanded and exports to Russia took off. However, many of the newly established fishing companies went bankrupt after the Russian financial crisis from 1998 to 1999 and exports to that country fell almost to zero. After 1999, quota shares were allocated on a historical catch performance

(transferable with the sale of the vessel) and a portion of the TAC was auctioned. This system, as would be expected, resulted in an increased concentration of the TAC in the hands of large corporate fishing companies.

The Chilean fisheries went through a process of being declared a state monopoly from 1963 to 1973, re-privatization from 1974 to 1978, followed by distribution disputes and significant re-entry of previous fishers and finally signs of over-fishing in 1982. A non-enforceable TAC was introduced in 1986 and complemented with limited individual quota shares and limited entry in 1991. (Pena-Torres, 1997).

As is explained in the previous chapter, the South African fisheries adopted quota management systems in the late 1970s and 1980s. Individual quota shares as a portion of the TAC were distributed on a yearly basis, but to be activated they have to be combined with a fishing vessel holding an access right to that particular fishery. The South African fishery has since the inception of the quota management system experienced quota share distribution problems—finally resulting in a reemergence of restricting the distribution of quota shares to companies and individuals who can primarily display business skills.

3.9.4 Vertical Integration, Concentration and Tradability

It is a fact that a distinctive feature of the South African TAC fisheries is large vertically integrated fishing companies (see chapters 2, 6, 7, and 8) with concentrated monopsonistic (or oligopsonistic) power. These companies control large portions of the TAC as raw fish inputs into the processing and marketing chain. Bross (1999) asserts that in the deepsea hake trawl fishery this was as a result of natural barriers to entry, namely, the high capital costs of the large vessels, the uncertainty related to exogenous environmental events, the high risks associated with sea-going operations and the monopolization of the output market (conveniently controlled by the vertically integrated companies themselves, resulting in a somewhat circular argument). Other theories of vertical integration and the boundaries to the size of the firm provide more convincing arguments. For example, a few are:

a An interpretation of Knight's (1921) explanation would be, because of the high level of uncertainty[13] and risk involved in fishing, fishing companies not only redistribute the risk from the fisher but also pool risk across a portfolio of fishing, processing and marketing activities. In other words, they vertically integrate to reduce risk by creating a risk-portfolio in a similar manner first described for the capital market by Markowitz (1921). This explanation is the most consistent with Bross's (1999) argument.

b Coase's (1937) argument is that firms vertically integrate when the transaction costs between firms are lower than the coordination costs within horizontally or vertically integrated firms. The limits to the size of the firm are set when the coordination costs become larger than the transaction costs of contracting outside of the firm. In other words, it could make sense for fishing companies to vertically integrate simply to reduce transaction costs.

c Where two firms entering into long-term contracts with co-specific assets (for example between a fishing vessel and a fish processing company[14]) face a hold up problem where one or both firms have market power (the ability to set raw fish prices), Joskow's (1985) solution is to vertically integrate. This, however, requires that one or both firms have some degree of market power. This market power may, for example, be facilitated by the state by either i) distributing a large portion of the TAC to one company (or in an oligopolistic fashion) or ii) licensing processing and marketing companies, in the form of for example export and processing quotas, in an attempt to control harvest levels by controlling the vertical chain.

An alternative way (as opposed to the racial and monopoly capital distribution issues prior to and during apartheid examined in chapter 2) of looking at the vertical integration of the South African fishing industry is that the state initially attempted to control harvest levels by restricting the processing capacity of the fishery. This is in some ways backed up by the fact that one of the factors contributing to the fall in harvest levels of Russian far east fisheries was a lack of processing and marketing facilities. However, Johnson (1996:131) states that this was mainly as a result of fuel shortages. There are fisheries management advantages to a vertically integrated

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[13] Uncertainty is stochastic and cannot be measured as a statistical risk.

[14] A consumptive fish processing company is less co-specialised than for example, a fish oil or fish meal processing one, because it can relatively easily substitute fish products with for example, chicken.

fishery[15]. An oligopolistic structure in the harvesting of marine living resources definitely reduces the informational costs of enforcing the fisheries management plan and accordingly limits the discrepancy between actual harvest and the TAC (a state monopoly solution, see section 3.5). In a similar vein, the tradability of quota shares, which has, on balance, resulted in a better allocation of fishing capital, has been criticized for the tendency to create a concentration of the TAC in too few hands. The inefficiencies that result are usually from price setting of raw fish either by the fishers to the fish processing companies (monopoly), or by the fish processing companies to the fishers (monopsonistic).

The distributional policy is determined by the state; for example, the state might adopt a 'supply-side' style of redistribution by first establishing a capitalist class (on racial grounds in South Africa and former African colonies, or simply creating it in the transition economies) and then implementing wealth redistribution strategies through progressive taxation and other government projects. However, in many of the developed world's fishing countries, the direct distributional effects on fishing communities are considered to be more important and more effective than the supply side distribution policies. In fact, many of the developed world's fisheries are for this reason subsidized. Canada, for example, only allows transfer of quota shares between fishers, but still worries "...that independent fishers will be swallowed up by 'corporate interests' in a transferable system", (Burke & Brander, 2000:153). Transfers have however resulted in more independent fishers vertically integrating their operations (Burke & Brander, 2000:153).

Norway, on the other hand, which devised its fisheries policy as a restructuring and distribution programme after World War II, strongly discourages concentration of power and 'sea lords' by only allowing "[s]ome [vertically integrated] firms, due to exclusionary provisions,...to own vessels" (Isaksen & Dreyer, 2000:4). New Zealand, who pioneered tradable individual quota share systems allows tradable quota shares and did not restrict trade between vessel owners only. In other words, vertical

[15] Crutchfield & Pontecorvo (1969) suggested that a monopsonistic structure in the pacific salmon fisheries might result in an efficient use of an open access fishery, which Schworm (1983) generalised and formalised.

integration is possible in New Zealand. They are, however, concerned with limiting concentration levels to less than 35% of the TAC (Shotton, 2000:49).

Matulich et al (1996) point out that in the absence of vertical integration the quasi rents of the fish processing companies may be transferred to the harvesting companies if quota share concentrations become sufficiently large and vice versa. In an expected result, Weninger (1999) highlights the importance of a competitive fish processing industry (assuming no market power to set raw fish prices by the harvesters) in establishing marginal cost pricing of raw fish inputs to the processing and marketing establishments. Matulich & Sever (1999:216) extend the concept to a bilateral monopoly (separate concentration in harvesting and processing), showing that if this industrial structure exists, within the normal restrictive assumptions, a TAC split between the processing and harvesting operations results in price efficiency and allocative efficiency.

3.9.5 Conclusions

In broad terms, the most important conclusions from the world experience, of which this section provides a very small but representative sample, are:

a That the large vessel fisheries (and some medium vessel fisheries) particularly in transition economies (and also economies with distributional issues) are better suited to big companies which can afford the large capital outlays and weather the risks associated with exogenous environmental and economic changes.

b That micro and small vessel fisheries are probably better and more efficiently operated by single small vessel owners who are also fishers. This keeps the rate of technological increase down (reduces capital stuffing) and provides an equitable spread of the benefits from the resource.

c Where TAC splits between large and small fishing companies are inevitable, coastal communities dependent on the marine resources for livelihoods must be taken into account (at least in the European Union's Common Fisheries Policy and other fishing countries who value the distributional effects of local fishing activities).

d That harvesting activities are intimately connected to processing and marketing activities. The industrial structure of one will affect the other. In

the large vessel fisheries, which tend toward concentrated industrial structures due to the large capital outlays, uncertainty and high risk, vertical integration may result in an efficient solution.

That the conversion of a state property regime into one that attempts to mimic a private property regime, namely the institution of transferable individual fishing rights of some form or the other, will usually result in more efficient factor allocations, but at the risk of accumulated economic power and a skewed distribution of benefits. Also, the design of individual fishing rights directly impacts on the costs of implementation and enforcement, the distribution of resource benefits (rents), the industrial structure and the pricing relationship between harvesting and processing and marketing operations.

3.10 COMPLEXITIES IN FISHERIES MANAGEMENT

What is obvious from the previous section is that fisheries can be complex systems. The biological information to set a TAC and develop the harvest restrictions is large. Further, because living marine resources are usually mobile and not readily visible prior to capture they cannot be geographically demarcated. Property right regime changes (normally to a state property right regime) have to replace open access situations to counter the adverse effect that the price system has on the conservation of the stock. In addition, because factor inputs will not be efficiently allocated under an unregulated state or common property regime (resulting in over-capacity and excess harvesting) individual fishing rights usually have to be designed so that private incentives coincide with the biologically determined limits on the environment. This requires a fisheries management plan that needs to be implemented and enforced.

Efficient implementation and enforcement in fisheries primarily requires information that is not usually provided by the market. Successful implementation involves first, acceptance by the fishing communities, for example, in the form of co-management, and second, effective and efficient enforcement. Effective enforcement requires i) keeping those without quota share out and ii) ensuring that quota holders harvest in accordance with the asset size they have been awarded. Finally, the design of individual fishing rights impacts directly on the industrial structure of fishing firms, thus also the pricing structures and their interaction with the market.

Fundamentally, there are three design problems in a TAC fishery managed by allocating quota shares to individuals. The first involves the actual biology and population dynamic studies. These become increasingly complex with multi-species fisheries (for example, Caddy, 1999 and Cohrane, 2000). Because biologists think in biocentric terms, it is possibly best for them to view humans as particularly efficient predators, but capable of being restricted both in how they predate and how much they take. In other words, the biological design problem exists purely to provide a 'resource management' plan, which sets boundaries on humans in terms of a TAC and catch regulations. In this thesis, the biological design problem is treated as an environmental constraint called the TAC (that is, an output or catch constraint).

The second design problem, assuming that a state property exists and individual quota shares are the proposed method to organise the utilization of the resource, is a technocratic one that requires a utilitarian view of the fishery (economics). The problem is to design a set of operational rules such that private fishing incentives are aligned as closely as is possible with the biological constraints and with an efficient allocation of factor inputs into the fishery. Further the informational requirements must be minimised to ensure the efficient implementation and enforcement of the resource management plan. In other words, a biocentric resource management plan is converted, by a utilitarian economic approach, into a technocratic fisheries management plan. This is the topic of the next chapter.

The third design problem essentially requires an anthropocentric view where the technocratic management plan is adjusted to take into consideration the social and political aspects of the fishing community and the broader policies of the country or economic union. This is essentially the work of sociologists, anthropologists and political scientists, but is approximated in this thesis by taking the distribution of the resource rent into account and being mindful of black economic empowerment in the South African context.

3.11 PAYING FOR FISHERIES MANAGEMENT

3.11.1 Introduction

Because the state fisheries authority usually designs, implements and enforces the fisheries management plan, revenue collections are usually required over and above general income taxation to pay for these services. They are also important because these instruments may influence economic behaviour and affect the design of the plan. The aim of this section is to outline in very broad terms the various revenue collection instruments available to fisheries authorities and to examine which ones are feasible in the South African situation. Although, the actual analysis of these instruments is relatively uncomplicated, they will not be covered in any detail.

Three broad groups of direct revenue collections[16] from private fishing companies are: i) royalty taxes or surcharges on revenue or profits, ii) quota share pricing and application fees and iii) harvest or landed catch charges. The second group, quota share pricing and fees, collects revenue when quota shares are allocated, the third group levies charges on the fish that have been caught, and the first group, collects royalty taxes (surcharges) only after the fish have been sold. Although the burden of the tax may be shifted, depending largely on elasticities of demand and supply, market power and industrial structure, the structural characteristics of each group of instruments are different.

3.11.2 Royalty Taxes

Royalty taxes, or surcharges on a revenue/profit ratio, were used in the South African gold mining industry for a short period at the beginning of the 20th century but dropped due to the complications on calculation and collection (van Blerck:1992). The ability of MCM to design and implement such a tax, bearing in mind their informational overload, which resulted in an organisational failure of the Branch, is probably insufficient at this stage. Royalty taxes are therefore not considered in this thesis. Another possibility exists, namely, that the South African Revenue Services could impose a surcharge on the income of fishing companies and transfer from

[16] Grafton (1995) looks at four instruments for resource rent capture in a rights based fishery, namely a quota rental charge (quota pricing and fees), profit charge (royalty), lump sum charge payable by each vessel (fee) and an ad valorem royalty (harvest or landed catch charge).

national revenue the necessary finance to run the fisheries authority. The vertically integrated nature of the fishing industry is, however, likely to create demarcation problems as to what is and what is not income from fishing activities. This option is also not considered feasible in South Africa at the moment.

3.11.3 Quota Share Pricing and Application Fees

The second group, quota share pricing and fees, is more promising. Quota pricing schemes, particularly with long term tradable quota shares of considerable value, have been used in a number of different fisheries around the world. The two general approaches to quota pricing result in i) either the state taking the risk by working out a marginal price for each unit (usually tons or kilograms) of each particular species or ii) transferring the risk to the quota holder by an auction process. Both systems should theoretically result in the quota holder paying a price exactly equal to their marginal valuation of the asset size (including their estimation of future raw fish prices and operational costs). Theoretically, a well-constructed application fee structure should charge a portion of the calculated marginal price or a portion of the historic value received under a previous auction. These instruments, if priced correctly, do not have any effect on fishing company behaviour as they capture pure rent. However, as is illustrated in the South African application fee case, these instruments can also be used as powerful social biasing structures.

In some cases the state sets a marginal cost quota share price based on a unit of a particular species. One way of achieving this is to calculate a candidate price and by an iterative process, if quota shares are allocated on a regular basis or charged yearly in the case of long-term shares, arrive at some approximation of the marginal price. Because South African quota shares are often leased to vessel owners (partly as a result of nonviable asset size allocations), the lease prices can be used to calculate (based on the portion of the TAC leased) candidate prices. This is a realistic option open to the South African fishing authorities and should not have distributional consequences.

Auctions have recently become popular allocation mechanisms, particularly of non-excludable but rival public goods, for example mobile phone licences, decentralised electricity markets to privatize companies and other purposes (Klemperer, 2002:169).

Auctions accordingly have been used in the allocation of fishing rights. In an interesting case, auctions were used in Estonia to reallocate fishing rights. The reason for this was that the TAC dropped in the large vessel fisheries and the proportions available to each vessel, based on historic catch records, did not provide a sufficient asset size to make the larger ones viable (Vetemaa et al, 2002). However, based on the principle of stability, 90% of the fishing rights were allocated (determined on a three year catch record from each vessel) and 10% auctioned. Entry was restricted to fishers and fishing companies (Vetemaa et al, 2002:99). The revenue collected from the 10% auction exceeded the amount collected on fees. However, processing companies without vessels bought quota shares and there was a noticeable increase in the concentration of fishing rights (Vetemaa et al, 2002:100-102).

When examining the efficiency of auctions[17] in an attempt to collect the marginal value of the quota share, auction design is necessary. Klemperer (2002:170) lists the key concerns in auction design as: discouraging collusive, entry-deterring and predatory behaviour. First from a collusion point of view, the industrial organisation is of primary concern; collusive behaviour increases with concentration, which in fact characterises the TAC fisheries in South Africa (see chapters 3, 5, 6 and 7). Second, although South Africa has clearly indicated that fishing is for entrepreneurs and not necessarily fishers, an auction with too few bidders usually generates prices below the marginal price. Finally, predatory behaviour where some bidders develop a reputation for aggressive bidding is "...particularly easy in repeated ascending auctions" (Klemperer, 2002:174).

In broad terms, and realising the fact that the characteristics of each fishery have to be considered, for South Africa to design an auction scheme for quota shares it would first have to decide on whether or not to restrict entry. If entry were restricted, the concentrated and monopsonistic structure of the TAC fisheries coupled with possible collusive behaviour would drop the quota share price to below the true value. On the other hand, if entry were not restricted, the fishing industry would likely become a speculative one (bearing in mind the uncertainty and risk associated with it), a situation that would be enhanced if the quota shares were made tradable and

[17] A good example of a review of the auction literature is Klemperer (1999) and Klemperer (2000)

minimum asset bundles not stipulated. To avoid collusion and predatory behaviour, Klemperer (2002: 174) suggests that repeated ascending auctions should not be used. In other words, sealed (first or second price) descending Dutch auctions are probably better and to avoid collusive behaviour should not be repeated too often. The trade-off in the frequency of quota share auctions is linked again to the uncertainty and high risk associated with fishing. The longer the period the greater the discount on uncertainty and risk becomes, thus also the lower the forward price of the quota shares. In other words, long-term quota shares will be undervalued in a one-off auction.

Finally, the distributional aspects have to be taken into account, namely a capital-poor historically repressed majority who were effectively barred from formal participation in the fishery until the 1980s. Even abstracting from the distributional effects, which would change the auction design substantially, a quota share auction must be designed that takes into account not only the optimal pricing structures but also the policy of the government (for example, whether or not the fishing industry is considered closed or not). At one stage MCM considered a sealed bid last price closed auction (RSA, 2001a) but dropped the idea because of the distributional issues.

Application fees are added into this section simply because MCM has decided to use them as an instrument to change the behaviour of applicants for quota shares even though they explicitly stated that they would not 'socially engineer' (RSA, 2001a:4). As is illustrated in chapter 2, the highly regressive nature of the South African application fee structure effectively created (along with the fishing for entrepreneurs ideology) a huge bias against the small fisher and in favour of the corporate fishing companies. A non-distortionary application fee, on the other hand, would levy a charge based on the asset size applied for and calculated as a fraction of the marginal pricing structure.

In summary, quota price auctions are difficult to design particularly if there is a strong redistribution constraint placed on them. MCM accordingly abandoned the idea.

Second, although MCM does not currently price quota shares[18] (they are, apart from an application fee, awarded for free), an iterative quota share-pricing scheme is administratively simple and would likely yield revenues to MCM that far outweigh the costs. It would, however, be a mistake to use them (as MCM did with the application fees) for creating policy biases in the fishing industry, particularly if the effect of the biases was not clearly understood to begin with. Finally, because of the dual rights system in South Africa, where quota holders need not necessarily be access rights holders (own and operate fishing vessels), these instruments collect revenue from quota holders, where harvest (or landed catch) charges are collected from vessels owners.

3.11.4 Harvest (landed catch) Charges

Harvest (landed catch) charges have been proposed as an alternative mechanism to catch restrictions (section 3.4) and are ubiquitously used to recover at least part of the public costs of fisheries management directly from the private fishing industry (Arnason, et al, 2000). Landing fees are levied on South African fishing vessels on a fixed fee basis (not indexed to the price received, which means that the charge increases when the price falls and vice versa, again a regressive structure), first as a research levy then as a charge towards the general Marine Living Resources Fund.

The issue of whether these charges should be used as a costs recovery instrument is an important one and is linked to the issue of co-management in commercial fisheries—Hersoug (2000) deals with this link in the New Zealand fisheries. If the costs of managing a particular fishery (this would include research, fisheries administration and enforcement costs) can be assigned to that fishery then the fundamentals of a cost recovery system are in place. Assuming further that the institutional structures[19] exist that can make consultative decisions on fisheries management choices (commercial co-management) then the structures of a cost recovery system are in place. Essentially, these bodies decide using a consultative approach the amount of research,

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[18] The Marine Living Resources Act of 1998 does in fact makes provision for quota share pricing. Quota shares should be leased (at their marginal price) to private fishing companies (see chapter 2).

[19] Provision for fishery-specific bodies that represent the interests of all stakeholders in that fishery, for example, private fishing companies, labour and trade unions, government scientists, other experts and public officials.

administration and enforcement required for their fishery and then make decisions on how to levy their members to pay for these services.

The consultative side is very necessary[20]; for example, the private interests would tend to want less services (fisheries management still remains a rival public good that is not excludable at least from the group) and the government scientists more (their task is to preserve the resource for the benefit of future generations by setting, based on good research, a TAC). The indexing of the charge to the price of raw fish is a group decision and is not that important from a behaviour-biasing point of view; the charge has been converted into a fixed cost (which is tax deductible in South Africa). The problem with this approach is that the large vessel fisheries, dominated by large corporate fishing firms, might require less research and enforcement than for example a small vessel fishery like the west coast rock lobster fishery that has many more quota holders' vessels. Whether the costs to MCM of facilitating black economic empowerment in the fisheries should be included in the normal fisheries management costs and thus under a cost recovery system is an unresolved issue[21].

3.11.5 Conclusions

The aim of this section is to examine very broadly the revenue collection instruments available to the South African fisheries authority, MCM, and to likewise provide a brief comment on their applicability to the South African situation. Quota share pricing is a good way for MCM to collect revenues without distortionary effects. Although MCM used a highly regressive application fee to socially engineer the application process to reduce the number of applicants (mainly as a result of their organisational failure due to information overload), a fee as a proportion of the per unit marginal price (the marginal price per ton or kilogram of some marine living resource) could have a similar effect if combined with a quota pricing scheme. Also, a per unit application fee allows for more careful budgeting, in the South African case for the external verification unit and allocating body. That is, knowing the size of the TAC, a minimum income could be determined before the process began. The harvest

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[20] This would also probably require a cost-benefit analysis of the fisheries management services for each fishery.

[21] Based on the fact that fishing is for entrepreneurs, and not necessarily fishers, coupled with the large biases against small fishing companies (or even greater for fishers) these costs are probably not substantial.

charge has been, and still is used successfully. Both MCM and the private fishing companies are used to harvest charges, but it could be better utilised if applied to a cost recovery co-management approach.

3.12 CONCLUSION

Using a simple (Gordon, 1954) bioeconomic model, the concept of property right regimes and property right regime changes is explained. The importance of property right regime changes for the commercial fisheries is that they establish a broad institutional framework from which to manage the fishery in a sustainable manner. The world experience in fisheries management is mixed, but generally starts with restricting entry into a fishery with territorial waters, usually a small vessel near-shore fishery, by means of a licensing programme and possible gear restrictions. With the extension of territorial waters to a 200 nautical mile exclusive fishing zone as a state property, where 90% of marine living resources are harvested, many large vessels had to return to home waters, leaving some coastal states with a harvesting under-capacity and others with a harvesting over-capacity.

The standard limited entry programmes, which also restricted the number of vessels entering the fishery, did not solve the over-capacity problems, for fishing vessels simply became more efficient (capital stuffing). This over-efficiency effect (a true case of over-capitalization of the fishing vessel in response to external stimuli) also moved to countries with under-capacity leading to a general over-capacity problem around the world.

The institution of individual quota shares, usually attached to vessels, was supposed to deal with the problem of over-capacity and if made transferable would at the same time solve the problem of efficiently allocating factor inputs into the fishery. Long-term quota shares would provide the necessary security of access to those who hold quota shares and this would result in responsible fishing and stability. The expected results, because of a number of factors, did not always emerge. Theorists are currently looking at the principles of fisheries co-management to assist in solving this problem. Similarly, the literature on property rights as an institutional form is gaining some attention.

South African fisheries management was, at the start, in trend with world developments. Shortly after being able to enforce its fishing EEZ it adopted along with the rest of the world, quota management systems and individual quota shares. The structure of South African quota shares was, however, somewhat unique. The country developed a dual system of fishing rights in all the major TAC fisheries, which meant that processing companies that did not actually fish could hold quota shares.

Problems arose in South Africa when the legitimacy of white-dominated oligopolistic fishing corporations and a competitive (also white-dominated) periphery was questioned. A new political dispensation in South Africa called for normalization and redistribution on the basis of race. The New Zealand Maori claims were dealt with under a specific institutional structure, namely, the expanded mandate of the Treaty of Waitangi. In transition economies, the privatization of micro, small and medium vessel fisheries was generally successfully implemented. On the whole, the privatization of the large vessel fisheries required a capital class and they were sold or auctioned to foreign and local non-fishing companies.

Around the world, the 'right of participation' was usually reserved for fishers and asset sizes were linked to their fishing vessels (usually based on previous catch history). Although the world experience indicates that the entrepreneur's 'right of admission' criteria might, but not necessarily, be feasible for the large vessel fisheries, it definitely is not the general practice in the micro, small and even medium vessel fisheries that still remain reserved for fishers.

Vertical integration of harvesting, processing and marketing is not seen as a problem in most fisheries, although some carefully restrict it while others regard it as efficiency enhancing. It is rather the concentration of power that is regarded as undesirable and for this reason the tradability of quota shares is viewed with suspicion.

Finally, MCM has traditionally only used a harvest (landed catch) charge as a research levy and quota shares were and still are awarded for free. A recent, but

rather bizarre, admission fee was implemented. What is clear, however, is that the revenue collection system needs to be reformed where income can be collected from both the quota holder and the access rights holder. To collect from quota holders, an iterative pricing mechanism starting with an informed candidate price (a well researched marginal cost pricing formula would be ideal) is preferable to an auction system in the South African situation. Because asset sizes of the quota shares show considerable variation (see chapters 5, 6 and 7), it is vitally important that the pricing structure is based on units (tons or kilograms of the resource) and not on quota shares.

The next chapter examines, in more detail, the form and structure of individual fishing rights, how they give rise to informational and flexibility trade-offs and how they can be used to design, implement and enforce efficient systems.

CHAPTER FOUR
INDIVIDUAL USER RIGHTS AND EFFICIENT FISHERIES MANAGEMENT SYSTEMS

4.1 INTRODUCTION

The previous chapter used a simple bioeconomic model to illustrate the various property right regimes and property right transformers that might exist in a fishery. Focusing on the 200 nautical mile EEZ, the state essentially has i) custodianship over all marine living resources, ii) the power to control exploitation, iii) the power to distribute individual fishing rights, iv) the power to devise the rights and duties of individual fishers and v) the power to enforce its rules.

In a market economy, ownership and individual property rights are generally seen as the key to economic success [(Mitchell, 1924), Pigou (1952), Coase[1] (1960), Demsetz (1964), Dales (1968), North (1990) and Barzel (2002)]. The challenge facing the state is to create exclusion criteria, distribute fishing rights fairly and to structure them so that the gains from private ownership are realized within an environmental or biological constraint. In other words, the state's role is to design and distribute individual fishing rights in such a way that individuals in a state or common property regime behave as if they were in a private property regime. The aim of this chapter is to provide some detail on the distributional issues and the important rules defining individual fishing rights and how they are expected to determine a pattern of incentives.

This chapter begins by briefly looking at the distributional issues of individual fishing rights, followed by establishing the various forms that fishing rights may take, that is, the biological exclusion regulations. Next, a discussion is presented on the most important rules that governments have at their disposal when designing individual fishing rights in TAC fisheries. Following this, it is proposed that rules available to the state for a TAC fishery, and within a distribution strategy, comprise a set of

[1] Coase's (1960) solution does require property rights; it is the distribution of the property rights that does not matter for efficiency. Depending on the assumptions, Coase's theory breaks down with only three parties (Aivazain & Callen, 1981), but with well-defined property rights, zero transaction costs and binding contracts it holds (Bernholz, 1997, 1998).

feasible options that will create, to a large extent, the patterns of incentives in the system. Finally, the South African TAC fishery case is analysed according to its distribution strategy, the design rules it has adopted for individual fishing rights and by bringing into consideration the details described in chapters 2 and 3.

4.2 THE DISTRIBUTION OF INDIVIDUAL FISHING RIGHTS

The role of the state with fisheries within the 200 nautical mile EEZ is to maximize social and economic returns from environmental goods, that is, in a normative sense to optimise some social welfare function. Fundamentally, valuable fishing resources are not naturally excludable and to ensure resource resilience the primary role of the state is to exclude one group of users in favour of another[2]. The first problem is to determine the rules for exclusion, that is, distributional rules that are considered fair. Rawls (1971:61) traditionally provides the starting point where he sets out to develop a set of principles of distributative justice that apply to the development of the basic structure of society. "They [the set of principles] are to govern the assignment of rights and duties and regulate the distribution of social and economic advantages." Rawls (1971:61).

Rawls (1971, 15, 72 102) proposes that the set of principles rests on the nature of the decision process within an original position which in turn depends on the setting in which the original position is established. A random natural distribution of human attributes and social position cannot be considered just or unjust, but it is unjust for society to accept these random outcomes by adopting institutions that perpetuate and exaggerate them (Rawls, 1971:102). To remove the bias determined by the individual's initial position, Rawls (1971: 136) uses a *veil of ignorance* to allow for an original position of total equality from which a social contract is written. Justice as fairness is thus introduced into the set of principles by constructing impartial equality into the original position.

[2]Favouring one group over another does not strictly establish a club good; clubs are defined as voluntary organisations. Buchanan (1965) first analysed the efficiency properties of clubs as voluntary organisations facing crowding externalities, followed by Cornes & Sandler (1968) and Ng (1974) on optimally-sized clubs.

Norzick, (1974:150-231) argues that this notion of justice as fairness excludes consideration of the entitlement principle. Individuals are entitled to holdings as long as they acquired them through voluntary transfers, exchanges and cooperative activities, that is, by legitimate means. More information is needed than is available in an original position reached by moving out of a veil of ignorance.

Bearing in mind that fishing activities did in fact take place before the advent of quota management systems that developed in response to the fishery as state property, certain entitlements, if they were acquired fairly, must be taken into consideration. Nozick's (1974) entitlement principle must hold water in, at least, developed market economy fisheries. This is true in light of the fact that optimizing some social welfare function also means restricting activity to a certain group. If the group has already been established by fair means and does not abuse market power, then it is unlikely that a redistribution of individual fishing rights will increase social welfare[3].

Primarily, in all fishing countries the group is restricted where possible to national citizens. Within this national group, Shotton (2000) provides evidence that the entitlement principle is commonly used in developed fishing nation states, for example, Argentina, Australia, Canada, the European Union, and the United States including Alaska. The entitlement principle as a distribution system is usually in the form of "(a) a catch history based on a receding period of the fishing and (b) some function of the dimensions of the vessel." Shotton (2000:48).

Three different situations are, however, immediately apparent. First, distribution problems in transition economies are mostly solved by various privatization schemes (Svejnar, 2002). For example, large-scale privatizations were done largely though auction mechanisms, coupled with the break-up of large national firms (Svejnar, 2002:15-15 and Johnson, 1996:132). The Russian small vessel fisheries were transferred to their collectives, called Kolkhozi, in a reform-type scheme (Johnson1996:132). In Poland, the large vessel fleets have not been privatized (Ziezuila, 2000), but private vessel ownership and access right purchases determined the distribution of the smaller vessel fleets (Lem, 2000 and Ruckes, 2000). A similar

[3] This is true for Bergson (1938), Samuelson (1947), Kemp & Ng (1976), and Harsanyi (1953,1955, 1977) social welfare functions.

case exists in Estonia (Vetemaa: 2000). Individual fishing rights in the Chilean fisheries, a public monopoly prior to 1973 (Pena-Torres:1997), were finally distributed by auction (Shotton, 2000).

Second, the strong claims for Maori fishing restitution in New Zealand forced a change in the original entitlement rule plan of the government (Hersoug, 2002). Bess (2000:9) reports that as a result of restitution claims, approximately one third of the TAC has been redistributed to the Maori. The issues that remain, however, seem to be the incorporation of traditional fisheries practice into the current individual transferable quota scheme of fisheries management in New Zealand (Bess, 2000, and Hersoug, 2002).

Third, apartheid policy unfairly affected the racial distribution of all economic goods and services in South Africa and its former colony Namibia. Redistribution of individual fishing rights, not restitution or reform strategies, is used in both countries to correct for racial imbalances. To recap briefly from chapter 2, the first distribution of quota shares in South Africa was restricted on the basis of historic involvement. The distribution mechanism was primarily supported by a unanimity rule debated among the participants, but if this failed the state would arbitrate. However, the concentration of individual fishing rights in the initial distribution was challenged resulting in a continuous redistribution process, first under an independent Quota Board (removed from public choice) then ostentatiously under a political decision-making, or public choice, process. The South African distribution issues are dealt with in more detail later.

What is immediately obvious from the above discussion is that Nozick's (1974) just entitlement criterion is appropriate in the developed market economies—meaning that these fishing nations can get on with the problem of allocative, or economic, efficiency. This is not necessarily the case where entitlements are not justifiable. In these situations redistribution is important, namely, i) from the state to private individuals in transition economies, or ii) from private individuals to customary groups as in New Zealand, or iii) from privileged racial groups to underprivileged racial groups in the South African and Namibian cases.

Focusing on redistribution in the South African case, what is first needed is a collective choice mechanism, or set of rules, that will enable the redistribution of fishing rights from one group to another. This, however, is not sufficient; the redistribution process must also result in the empowerment of the underprivileged racial group, that is, a redistribution of wealth and capital. On top of this, to comply with the economic policy objects of the government—the Growth, Employment and Redistribution strategy (GEAR)—the redistribution process must be carried out as far as is possible within the market system.

An analysis of the South African distribution policies, however, requires consideration of the form of the fishing rights, or biological and technological regulations, and an understanding of the rules that could be used to design individual fishing rights. These set up the incentives that determine the behaviour of individual economic agents and are discussed below.

4.3 THE FORM OF FISHING RIGHTS

Charles (2000:1) divides the form of individual fishing rights into two broad categories, namely, access rights and withdrawal (harvest) rights. Access rights "...refer to the capability to enter a fishery and participate in it..." and withdrawal or harvest rights are "...reflected in the level of fishing...and the quantity harvested" (Charles, 2000:1-2). When the form of fishing rights is based on restricting access, two types are most common. First, access may be limited by restricting entry, usually through the issuing of licences or permits. Second, rights to harvest in a specified geographical location may be assigned to individuals or groups; these are called territorial use rights in fishing (TURFs). Withdrawal fishing rights can take the form of either effort or harvest restrictions. Effort, or input, controls regulate an allowable level of inputs, for example, the number of fishers, the time fished, the amount of gear and certain gear attributes. These controls are often expressed in terms of total allowable effort (TAE). Output control takes the form of limiting the total harvest usually through a total allowable catch (TAC) based on a measure of MSY or MEY.

Table 4.1: The form of fishing rights.

Access Rights		Withdrawal Rights	
Limited entry access rights	Territorial user right fisheries (TURF)	Input or effort rights (TAE)	Output or catch rights (TAC)

Source: Adapted from Charles (2000:2).

Table 4.1 above, adapted from Charles (2000:2) presents a decision table based on two levels of restriction. The primary choice is between access and withdrawal rights. By choosing access rights as the primary level of restriction, entry can be limited by either i) the number of individuals harvesting the resource but without geographical restrictions or ii) to a geographical area by using territorial user rights (TURF). Using withdrawal rights as the primary choice, secondary restrictions may be imposed by either harvest input or harvest output limitations in the form of a TAE or TAC respectively.

The form of fishing rights developed by Charles (2000) does not, however, take into consideration that an access right might be limited by a withdrawal restriction and vice versa. In fact, the experience in most of the world's fisheries follows the sequence of primary access rights later limited by withdrawal restrictions, usually in the form of a TAC divided into quota shares (Scott, 2000:3). The second level choice options are represented on the decision tree below. The first two choices (1° and 2°) are identical to Charles' (2000) and the second two (3° and 4°) are in accordance with Scott's (2000) observation. Although the structure of individual rights and the distributional issues are only dealt with later in the chapter, the logical choice sequence is included below.

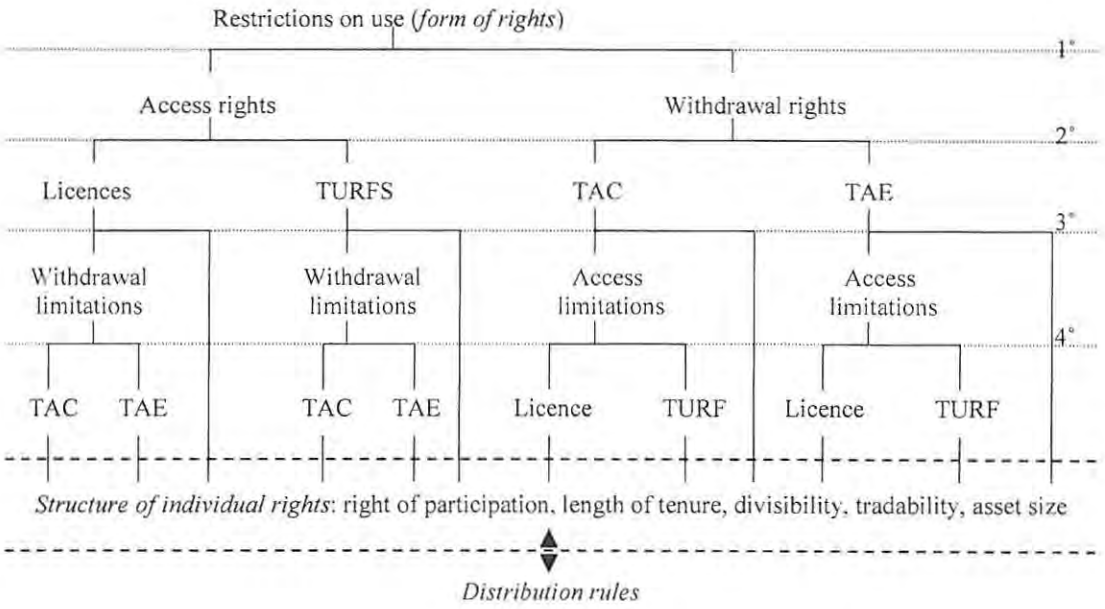

Figure 4.1: Decision tree for the form of rights showing four levels of choice and each choice leading into the structure and distribution of individual rights.

In essence figure 5.1 presents the form of rights (1° and 2°) with limitations (3° and 4°). The first and second level can be either i) in the form of primary access rights instituted by imposing second level licences or TURFs, or ii) that either TAC or TAE as a second level restriction may limit a primary withdrawal right. What is immediately clear is that there are four equivalences. For example, primary access rights in the form of a licence but limited by a TAC is equivalent to a primary withdrawal right in the form of a TAC but limited using licences. The other three i) licences with TAE and TAE with licences, ii) TURFs with TAC and TAC with TURFs, and iii) TURFs with TAE and TAE with TURFs are the remaining equivalents. In addition, there are four forms without limitations, namely, i) access rights in the form of licences and TURFs without withdrawal limitations and ii) withdrawal rights in the form of TAC and TAE without access right limitations.

Although the structure of fishing rights, discussed later, will determine the eventual outcomes, the general results below are true. Licences without withdrawal restrictions give rise to the capital-stuffing problem where, for example, fishers expand the harvesting capacity of their vessels in the race-to-catch (see chapter 3). In a similar result, TAE forms without access restrictions give rise to the race-to-fish problem and a ratcheting down of the time fishers are allowed to harvest. TURFs without

withdrawal restrictions provide a better result as geographical limitations immediately set up quasi-property rights—fishers will tend to conserve the resource to maximize their own benefit if they can establish geographical boundaries from which to exclude others. The TURF solution is, however, only possible with non-migratory species and generally near-shore resources, for example, abalone. Last, a TAC form without stipulated access restrictions allows any fisher holding a quota share of the TAC to harvest.

Finally, focusing on the South African TAC fisheries, two distinct forms evolved in response to institutional and organizational change, which were introduced in chapter three, as a system of dual rights. This is illustrated below.

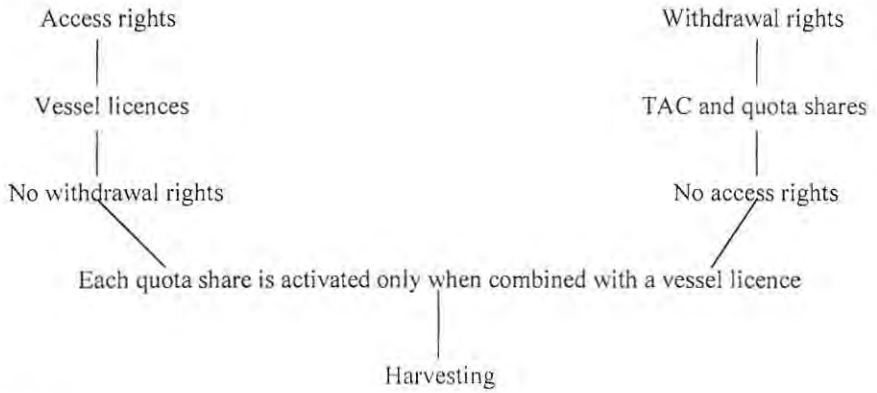

Figure 4.2: The dual form of fishing rights applied to the South African commercial TAC fisheries

The important excludability issue in this dual system is to determine the dominant form. Can the state prevent the owner of a quota share access to the resource, and/or can it withhold a quota share from a licensed vessel owner? In answer to the first question, Plasket (2002:16) states:

> "..., the [Marine Living Resources] Act draws a distinction between the two [access rights and withdrawal rights] that renders the provisions of the two sections irrational. The Act appears to envisage that it is possible that a person may be granted a right to fish [withdrawal right] but be denied a permit to fish [access right]. That, with respect, defeats the purpose of the Act – which is to allow certain people to fish commercially by allocating to them what are termed rights of access – and is probably unconstitutional: to grant a right with commercial value and then prevent its exercise would amount to an arbitrary deprivation of property as envisaged by s25(1) of the Constitution. It would also render the right vulnerable to cancellation in

terms of s28(1)(e) because a person with a right but no permit cannot effectively utilize that right." (Plasket: 2002:16).

In other words, a withdrawal right automatically grants access. In response to the second question—can the holder of a vessel licence be denied a quota share?—Plasket (2000:16) states;

> "To complicate the issue still further, the Act also makes provision, in s23, for the licencing of fishing vessels. This is, however, more rational than the distinction between a right of access and a permit because, one presumes, such matters as suitability for the purpose, safety and seaworthiness, and ability to monitor will be relevant to whether a vessel ought to be licenced or not."

A vessel licence does not give any right to withdraw, but a withdrawal right does give right of access. The form of rights in the South African commercial TAC fisheries is thus interpreted as a primary withdrawal right without stipulated access restrictions, one of the eight options outlined above. Access is in fact limited to the number of quota share holders, but it is very sensitive to the structure of individual fishing rights, in particular the minimum asset size of the quota share. The important operational rules available in designing a structure of individual fishing rights are discussed in the next section.

4.4 OPERATIONAL RULES OF INDIVIDUAL FISHING RIGHTS

4.4.1 Introduction

The form of fishing rights outlines the excludability criteria necessary for a private, or quasi-private property regime to exist. In this section, the structural characteristics or operational rules that define the individual user right are discussed in terms of the right of participation, asset unit size, tradability and duration of term. Various authors have recently focused attention on individual fishing rights as a management tool, but mainly in an attempt to show what characteristics of individual fishing rights are necessary to create ideal, or secure, property rights. Scott (2000:5) lists the important attributes as exclusivity, duration (of term), security of title and transferability (tradability). Arnason (2000: 19-24), based on Scott's (2000) attributes, develops a Q-measure to estimate the quality of fishing rights in Iceland, New Zealand and Norway. Again using Scott's attributes, Shotton (2000: 45-50) compiles tables of current national practice for Australia, Canada, Chile, Iceland, the Netherlands, New

Zealand and the United States. In a paper which effectively links the theory of rights based management to the practice of rights based management while cautioning that each fishery should be treated separately, Anderson (2000:28-29) introduces the attributes of eligibility to own, the duration of ownership and two transferability (tradability) options. Willmann (2000:51-56) questions the wisdom of market efficiency in the individually transferable quota programmes by focusing on fisher participation and group rights in fisheries. Most, however, are primarily concerned with the allocative efficiency rules designed to mimic market solutions, namely, transferable individual fishing rights of long-term duration (explained in chapter 3).

As is stated previously, primary withdrawal rights without stipulated access restrictions regulate the South African TAC fisheries, and quota share redistribution and empowerment issues are critically important. In this regard, the right of participation (or Anderson's (2000) eligibility to own) is important as it impacts directly on asset sizes (size and value of the quota shares). These two rules, right of participation and asset sizes, are added to the dominant tradability and length of term rules. Scott's (2000) exclusivity attribute is dealt with under the section on the form of rights, but is examined again, along with the security of title, later in the chapter. Security of title, for example, must also depend on the ability to enforce compliance with operational rules of individual fishing rights and success in excluding non-right holders from exploiting the resource.

4.4.2 The Right of Participation Operational Rule

Anderson (2000:28) asks the question "[s]hould any legal entity be allowed to own the [individual fishing] right or should ownership be limited to natural persons or to specific types or groups of persons?". First, the form of rights (section 5.3) sometimes limits the right of participation to specific groups. Any form that restricts access, either as a primary form or a secondary limitation, defines particular groups that may participate in the fishery. The only form that does not define an eligible group is a primary withdrawal right with unrestricted access. Second, allowing eligibility to hold individual fishing rights (right of participation) by any legal entity, as opposed to only natural persons, presents a trade off between the risk of having absentee sea lords and the inherent inflexibility of limiting participation to particular individuals.

4.4.3 The Asset Unit Size Operational Rule

Dales (1968:797) defines a minimum asset unit as "...the smallest physical amount of the asset to which it is practicable to apply property rights, i.e., for which it is practicable to enforce exclusivity of use". The concept of a minimum asset unit and quota shares is highlighted when making the distinction between the quota share as a percentage of TAC or as a fixed tonnage. On the one hand, as discussed previously, quota shares as percentages of the TAC put the risk of exogenous environmental fluctuations onto the fishers whereas with a fixed tonnage quota share the risk is borne by the state. For example, with a quota share as a percentage of the TAC, exogenous environmental disturbances affect the private fishers where a viable minimum asset unit in one year may become unviable in the next. On the other hand, with a fixed quota share system and with a rise in the TAC, new entrants are introduced, but when it falls and if minimum asset units are considered important, fishers have to drop out. These distributional decisions must be taken by the government agency.

Obviously the size of the minimum asset unit as a quota share depends on the adoption of other operational rules. At one end of the spectrum, if the quota share is linked to a vessel, called a vessel quota, then the minimum asset unit must be sufficiently large for the vessel to cover its costs and make a profit (taking into account the average risk characteristics of the fishery). At the other end of the spectrum, a speculative market for quota share and the transaction costs of trade would likely influence the minimum asset size of a transferable quota share without access right restrictions.

4.4.4 The Tradability Operational Rule

The argument behind tradable individual fishing rights is that the most efficient fishers will eventually buy up quota shares in asset sizes that are best suited to their technologies. Generally, however, tradable individual fishing rights must be at least capable of i) divisibility if distributed in large asset sizes and ii) consolidation if initially allocated as economically non-viable asset units. This ensures economic and thus allocative efficiency but not distributional equity. From a resource management perspective, because tradable individual fishing rights encourage economic efficiency and possible long term planning, the private incentive to conserve the stock for later

periods is more closely aligned to the social benefit derived from environmental resilience. In other words, it removes to some extent the race-to-fish.

The argument against tradability is that the right to fish is a free consignment of a public resource (Anderson, 2000:29) and a speculative market with the sole purpose of capturing the resource rent is inappropriate. Also, the accumulation of large proportions of the TAC by speculative 'sea-lords' might not result in economic efficiency through, for example, a monopolistic industrial organization. To discourage speculative markets developing, the notion that trade in individual fishing rights be restricted to certain fisher groups—defined by the right of participation operational rule—results in a more desirable distribution of resource rents among fishers (Anderson, 2000:30). The trade-off here is that restrictions of this sort could inhibit the flexibility of efficiency-enhancing exchanges that the tradability operational rule was supposed to achieve in the first place.

4.4.5 The Duration of Term Operational Rule

The duration of term is the operational rule that stipulates the number of periods for which the individual fishing right is awarded and thus also the degree of assurance that the right will not be redistributed to another competing user. The duration of term is thus positively related to the security of the right. The term may range from a single period (usually a year) to an inheritable right. If a quota share as a percentage of the TAC is awarded for more than one period, the absolute amount that the individual is allowed to harvest changes with changes in the TAC—this absolute amount is commonly referred to as an annual harvesting right (Anderson, 2000: 27). This distinction is particularly important when combined with the tradability rule.

The duration of term of fishing right impacts directly on the sustainable use of the natural resource. Fishers have fewer incentives to comply, particularly with withdrawal restrictions, if the security of tenure is low and /or the term is short. Even with longer-term rights, strategic overexploitation due to non-compliance may occur during the first period: the result of a multiple period prisoners' dilemma game. For example, if a 10-year individual fishing right is awarded, initially a fisher has an incentive to overexploit in the last period, but the fisher also knows that other fishers will behave strategically. The fisher will therefore strategically overexploit in the

ninth year. Similarly, other fishers will behave accordingly with the eventual result being that strategic overexploitation is ratcheted down to the first period. Strategic overexploitation can be avoided if surety of renewal[4] is given before the end of the term.

The argument for the inheritability of individual fishing rights is often linked to the legal nature of ownership (Scott, 2000:4). Full liberal ownership of things as defined by Honore (in Fedderke et al, 2001:115) is: "the right to possess, the right to manage, the right to the income of the thing, the right to the capital, the right to security, the rights or incidents of transmissibility and absence of term, the prohibition of harmful use, liability to execution and the incident of residuary". Based on these, the fundamental argument is that full liberal ownership gives rise to efficient ownership patterns where individuals have incentives to create, maintain and improve assets. To achieve this in the fishery—which means solving the efficiency and conservation problem—both the stock (right to the capital) and the flow (income from the thing—interest) must be transferred from 'common' or public ownership to private interests.

Taking a contractarian view of economic ownership, when decision rights are inappropriate or difficult to assign, then Grossman and Hart's (1986) virtual ownership is consistent with the right to control the residual and is commonly expected to result in an efficient outcome (Milgrom & Roberts, 1992:320). In the fishery the inherent design problems (see chapter 3) make decentralised decision rights difficult to assign, particularly if there are a number of competing users exploiting the same fish stocks. In addition, if a coastal state considers it inappropriate to transfer a stock of valuable public assets, particularly when exclusion is difficult, into private hands, then the concept of virtual ownership becomes important. From this point of view, the right to control the flow without owning the stock is tantamount to economic ownership and may result in an efficient outcome. This is provided that there are other enabling operational rules, most importantly the transferability of the right. In this situation, even medium-term individual fishing rights can provide sufficiently good ownership patterns if they are renewed before the end of their term. From efficiency argument, extending the term into inheritability is

[4] Providing, for example, that fishers do not contravene the rules of exploitation.

not necessary. The logic of inheritable rights boils down to a public choice rather than a straight economic efficiency argument; simply, governments might be reluctant to redistribute individual fishing rights on a regular basis.

Finally the duration of term, linked to the security of the individual fishing right, is relevant in light of the fact that fishing vessels are specific assets co-specialized with individual fishing rights. Fishing vessels accordingly earn quasi-rents but only when linked to fishing rights. With shorter-term low security rights, capital reinvestment in fishing vessels, particularly in the large vessel fisheries, might be slower than with long-term rights.

In the South African terminology, a short-term right is for one year, a medium term right is for four years and a long-term right is for a maximum of 15 years. Rights are not inheritable in South Africa.

4.4.6 Conclusion

The four most important operational rules available to a state when designing the structure of individual fishing rights are presented above. Right of participation allows entry into the fishery to be limited to particular groups. The logic of manipulating the asset size of the quota share or the annual harvesting right (AHR) becomes more apparent when combining it with the tradability operational rule. Finally, the duration of term impacts on the security of the right, resource resilience and reinvestment. The structure of individual fishing rights is determined by the way the operational rules are arranged around a particular form of right. This is presented below.

4.5 DECISION PATHS, OPERATIONAL RULES AND EFFICIENCY

The structure of individual fishing rights is determined by a set of operational rules applied to a particular form of fishing rights. Because this thesis is concerned with quota management systems in the South African setting, the operational rules will be applied to only TAC forms.

The TAC forms and their equivalents are composed of two groups (section 4.3), namely:

a) TAC fisheries with restrictions consisting of two forms
   - TAC fisheries limited by TURFs
   - TAC fisheries limited by licences.

b) TAC fisheries without restrictions.

To make the structure of rights more manageable some limiting, but not unrealistic, assumptions are drawn with regard to the TAC fisheries with restrictions.

The TAC fisheries limited by geographic area, TURFs, are only feasible where a species can, within a reasonable probability, be biologically demarcated to a relatively small geographical area. This is only possible with slow moving, sedentary or locally endemic species. Most of these species occur near to the shore and access costs are accordingly low. These characteristics lead to the assumption that technological efficiency requires the use of micro to small fishing vessels. Thus, the assumption is made such that the initial 'right of participation' rule limits participation to micro and small vessel owners and to geographical area. For convenience of nomenclature, when extending the above 'form of right' into applicable individual fishing right structures it will be called a $TURF_{TAC}$ to illustrate that the TAC quota shares are attached to a geographical region and micro to small vessels

Fisheries limited by licences and a TAC are assumed to be those where it is not biologically possible to create a TURF. The applicable species are migratory and very difficult to observe prior to capture, for example, the South African pelagic (anchovy and pilchard) and demersal (hake and sole) species. The technological assumption takes into consideration that the fishing vessels are usually larger than those for a TURF and capable of staying at sea for longer periods, that is, the minimum optimal size is probably, but not necessarily, at least a medium sized fishing vessel. An initial 'right of participation' assumption is also applied to this form of right, namely, that participation is limited to owners of fishing vessels. Again for convenience this 'form of right' along with its assumptions will be called a $VESSEL_{TAC}$ to show attachment of the quota shares to medium sized or larger fishing vessels.

Fisheries limited by a TAC without any qualifying restrictions require neither a technological nor an initial 'right of participation' assumption. Anyone with a quota share for a particular species can buy a fishing vessel and harvest that species anywhere within the 200 nautical mile EEZ. Although the technological efficiency factors are identical for the fisheries mentioned above, it is not necessary or appropriate to place a restrictive assumption on them when extending this form of right into a structure of individual fishing rights. The nomenclature for this form is called, for obvious reasons an $UNATTACHED_{TAC}$.

The next step, before the various feasible structures can be considered in an orderly way, is to first remove any redistribution constraint. The structure of individual fishing rights for the three forms of TAC fisheries, namely, a $TURF_{TAC}$, a $VESSEL_{TAC}$ and an $UNATTACHED_{TAC}$, can then be constructed with a focus on efficiency. For each form, the decision choice paths of the four operational rules proceed as follows:

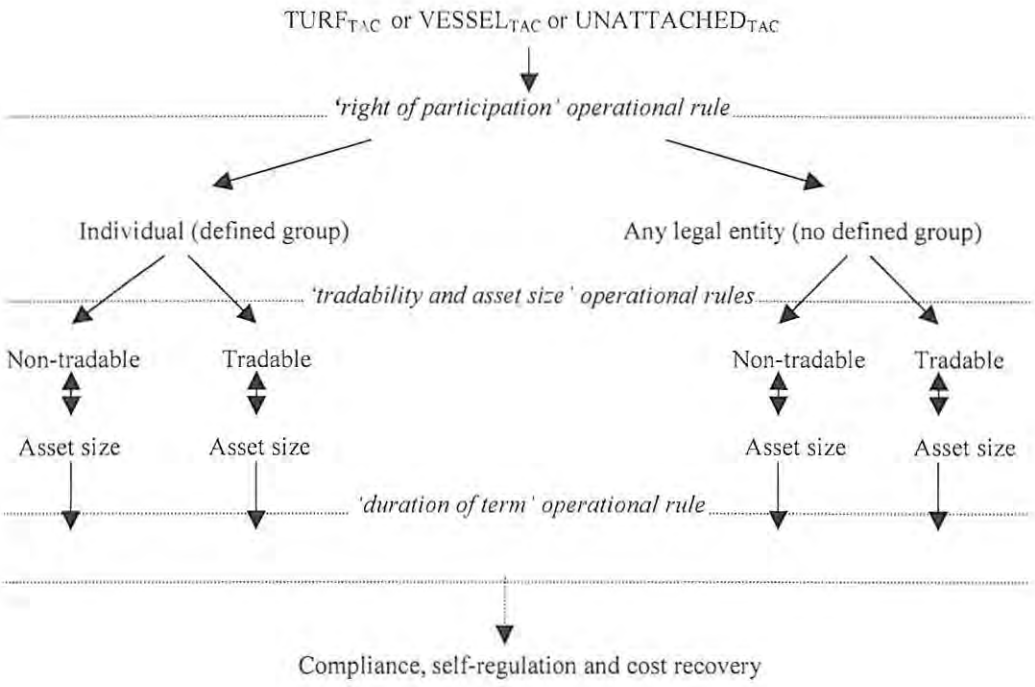

Figure 4.3: Decision choice paths and operational rules.

The first choice deals with the 'right of participation' operational rule where the state chooses between restricting individual fishing rights to either a defined group of individuals or an undefined group. Tradability and asset sizes are considered next followed by the duration of term. The particular structure of individual fishing rights that emerges will impact on the efficiency of the fishery as a micro-economy.

When the operational rules are combined into feasible sets, the structure of individual fishing rights is considered to be those institutions that Furubotn and Pejovich (1972: 1139) refer to as "...the sanctioned behavioural relations among men that arise from the existence of things and pertain to their use" and allude to North's (1990:3) "...humanly devised constraints that shape human interaction...[and]...in consequence...structure the incentives in human exchange". Stated more simply, the structure of individual fishing rights establishes a pattern of incentives. Because fisheries have to be managed, positive efficiency requires that these individual incentives be aligned to the fisheries management plan and if individual fishing rights are effectively designed, implemented and enforced, then the outcomes of economic activity will tend to be efficient—at least to those included in the plan (adapted from Milgrom & Roberts, 1992:24). The three elements of the efficiency principle are further elaborated as follows.

First, the inherent flexibility of the system is determined in the design stage. A flexible system, for example, provides economic agents with the ability to more effectively adapt to changes. The design problems and the brittleness of the fisheries system (chapter 3) mean that all fisheries have to be managed. The effective design of individual fishing rights thus means that the expected pattern of incentives must have both explanatory and predictive power over the resulting micro-economy.

Second, the informational requirements determine the effectiveness of implementation. Generally, implementation of a plan is more effective with low informational requirements. In a market system with clearly defined property rights, no design problems and private goods, prices and local knowledge are the only informational requirements for an effective implementation of the resource allocation plan (Hayek, 1945 and Hurwicz, 1973). Fisheries management systems are brittle

(chapter 3) with high informational needs. Effective implementation requires that these informational needs be minimized.

Third, enforcement in a fishery requires a policing function over and above the incentive structures, that is, self-enforcement in the group is only possible up to a certain extent. Policing is necessary to keep non-right holders out, to ensure that right holders comply with their duties, to limit fishing capacity and to ensure that fishers pay levies or taxes to finance the fisheries management system.

From a positive efficiency point of view, the pattern of incentives established in the structure of rights must thus be tested against flexibility, informational requirements, fisheries management costs, the possibility of recovering the costs of the fisheries management system from the fishers themselves, administrative ease and the various aspects of enforcement. Distributional issues aside, it is known that a market solution with private goods solves the above problems.

The evidence from the international arena is that during the 1990s "[f]or many fisheries, it [a market orientated structure of individual fishing rights] removed all or nearly all the wasteful and costly incentives [over-capacity incentives] at one stroke." (Scott, 2000:3). However, many developed fishing nations are still concerned with distributional issues, namely, to keep fishing in the hands of fishers and to discourage so-called absentee sea lords. This generally requires a trade-off between the desired distribution and the flexibility of the system. These issues are examined using the decision paths (figure 4.3) for the three forms of TAC individual fishing rights developed in section 4.4.

4.6 STRUCTURE: NO REDISTRIBUTION CONSTRAINT

4.6.1 Introduction

Initially the operational rules will be applied to the three forms, assuming no redistribution constraint. Removing the redistribution constraint, however, is not to say that the distribution of individual fishing rights is considered unimportant. Because redistribution is important in South Africa, a redistribution constraint must be placed on the three forms and its effect on efficiency examined (section 4.7).

4.6.2 $TURF_{TAC}$ Fisheries with No Redistribution Constraint

To recap, the $TURF_{TAC}$ fishery is restricted to a geographical area and owners of micro to small vessels (no larger than 14m—chapter 2, table 2.1). Only feasible choices will be discussed and each group will be treated separately and then compared to assess likely outcomes. The first choice is essentially a distributional one. Applying the 'right of participation' operational rule the state makes the decision on whether it wants to restrict 'participation' in the $TURF_{TAC}$ shares to a defined group (individual fishers) or an undefined group (any legal entity). The second decision is whether to make the $TURF_{TAC}$ share, as either an individual or company right, tradable. $TURF_{TAC}$ shares to a defined group (individual fishers) will be examined first, followed by $TURF_{TAC}$ shares to an undefined group (any legal entity).

4.6.2.1 Non-tradable $TURF_{TAC}$ shares: individual fishers

Minimum asset sizes are important in non-tradable $TURF_{TAC}$ shares that are restricted to individual fishers; they cannot be consolidated or divided. The minimum asset size must be of a sufficiently large geographical area to make the standard fishing vessel operating in the TURF economically viable. This should take into consideration a reasonable variation in stock abundances that could be based on, for example, historically observed environmental changes. If the asset size is too small, the fisher has the incentive to harvest more than is sustainable from the geographical area during the first period.

Provided fishers have minimum asset sizes, the minimum duration of term must be long enough for the fisher to recover the costs of fisheries-specific capital in a reasonable period of time. Similar to minimum asset sizes, if the term is too short, fishers will have incentives to harvest more than is sustainable from the geographical area to cover their costs of capital and to make a reasonable return. Providing that fishers are allowed to alter the technological characteristics of their vessels, the term structure will also increase the flexibility of the system. For example, with a reasonable length of term, to minimize costs fishers will adjust vessel sizes and harvest technology in accordance with the geographical area—a technologically efficient solution. From the resource efficiency side, the length of term will have a

positive impact on the incentives of fishers to ensure resource resilience and practice resource husbandry.

The most difficult part of implementing the system is determining the initial conditions, namely, the minimum asset size, the duration of term and the distribution of $TURF_{TAC}$ shares. Assuming that these parameters have been satisfactorily implemented with long-term leases, the system results in both technological and resource efficiency. If a fisher drops out, the state simply looks for another suitable candidate[5] to whom the $TURF_{TAC}$ can be awarded; alternatively the state can make the $TURF_{TAC}$ inheritable. The inheritability does not increase efficiency[6]. Because the group is easily definable and the geographical areas delineated, the information necessary to implement a fisheries management system of the $TURF_{TAC}$ involves determining the TAC and other biologically relevant information (the major design parameter), keeping a register of fishers, assisting right holders with policing and arbitrating new entry in response to dropouts.

Effective enforcement means excluding non-right holders, restricting harvest capacity and ensuring the right holders comply with restrictions. Again because of the easily definable group and geographic delineation, it is in the interests of right holders to pursue active exclusion strategies—that is, up until the point where the marginal cost of policing illegal resource use is identical to the marginal benefit from the additional resource available through lower levels of poaching. The role of the state is to provide, as with all normal private goods, the means to effectively prosecute poachers. Secure rights, namely, with minimum asset sizes and suitably long-term leases, provide incentives for individuals to be harvest efficient (just sufficient capacity) and to comply with regulations but only if credible agents establish them.

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[5] The state can create rules to determine suitability, for example, a son or daughter could take preference in the event of a parent wanting to retire or the $TURF_{TAC}$ can be redistributed to another family group already in the fishery but wanting to expand. In effect a similar situation is established with agricultural land, except that in the fishery the state controls the distribution mainly because the resources fundamentally belong to the public.

[6] Being essentially private property, an inheritable right is very difficult to remove and coupled with the severe design problems—the biological system—the state lowers the risk of environmental collapse by leasing the right.

The general conclusion is that a non-tradable individual $TURF_{TAC}$ share restricted to a specific group of fishers can result in a system that is technologically efficient, harvest efficient and resource efficient. In other words, if the structure of rights is correctly established, the distribution of rights is seen as fair, and those who determine the biological parameters are perceived as credible[7], then the system will be efficient. Under these conditions, it would be reasonable to assume that fishers would be willing to pay levies or other forms of user charges to finance part of credible biological research costs, the resource management costs and policing costs. This is assuming that the fishery is a single species fishery and that biological research, fisheries management and policing all contribute to the health of the environment which is a pure public good. Under these assumptions, efficiency dictates that some of these costs are financed from general income taxes.

4.6.2.2 Tradable $TURF_{TAC}$ shares: individual fishers

The next question is whether efficiency is enhanced in any way if $TURF_{TAC}$ shares restricted to individual fishers can be traded, consolidated and divided. Because the $TURF_{TAC}$ shares are restricted to a select group of fishers, trade can only take place between them. By introducing tradability, minimum asset sizes are not important; fishers can through trade consolidate and divide $TURF_{TAC}$ shares into desired asset sizes determined by their existing technological requirements. This option also results in technological efficiency. The increased flexibility, however, means that the risk of correctly determining an efficient asset size is transferred from the state in a non-tradable option to the fisher in a tradable one. Fishers who are not, however, assured of a minimum viable asset unit could harvest more than is sustainable. The duration of term essentially determines the value of the $TURF_{TAC}$ shares—the longer the term the more valuable the shares. The tradability of the $TURF_{TAC}$ shares may also have unplanned distortions on the distribution of shares, for example, excessive concentration or dispersion.

The increased flexibility adds to the amount of information necessary for effective implementation of a fisheries management system. The state has to keep a register of

[7] These people are usually, but not necessarily, government scientists. For example, if the government scientist is not viewed as credible, the incentives for right holders to harvest at a biologically determined MSY are substantially weakened—a typical principal-agent problem.

all trades in order to keep track of shareholders and where they are fishing, as well as the accumulation and dispersion of shares. The biological design problems might also be worsened if smaller and smaller units require withdrawal determinations. The effectiveness of enforcement is also reduced if asset sizes and shareholders can be relatively easily changed. One solution is to put an upper and lower limit on asset sizes, but this reduces the flexibility (from a technological efficiency point of view) of the system and still requires more information than non-tradable $TURF_{TAC}$ shares.

From a system efficiency point of view, tradable $TURF_{TAC}$ shares are less effective in implementation and enforcement but more flexible within a shorter-term duration than non-tradable shares. With increases in the duration of term the value of the tradable $TURF_{TAC}$ shares rises. On the other hand, with an increasing duration of term, non-tradable shares enhance technological flexibility. The trade-off between tradable and non-tradable $TURF_{TAC}$ shares thus boils down to the gains from technological flexibility in the short term.

4.6.2.3 $TURF_{TAC}$ shares: undefined group

By changing the 'right of participation' from a defined group of fishers to any legal entity, the ability to define the group becomes impossible. For example, in most market economies companies are not generally restricted to one activity only—a fishing company may also deal in other food products—and the sale and transfer of companies is not usually restricted. In other words, by allowing any legal entity to hold $TURF_{TAC}$ shares, a built-in tradability, and thus also flexibility, option is included; companies may be bought and sold along with their fishing rights. In this way companies can increase their asset sizes by buying up other $TURF_{TAC}$ shareholding companies. The risk of determining minimum asset sizes is transferred from the state to the $TURF_{TAC}$ shareholding companies. Allowing the $TURF_{TAC}$ shares to be traded between companies, the risk to the company is also reduced and the flexibility of the system increased. The duration of the term is again positively related to the value of the share. The advantage of this option is that it is sufficiently flexible to i) allow anybody access to the fishery provided that they can buy a company with a $TURF_{TAC}$ share, and ii) enable technological efficiency and the determination of optimal asset sizes. The disadvantage is an increased likelihood of

absentee 'sea-lords', who may be protected by limited liability, controlling the natural resource.

The informational requirements are potentially greater in the tradable option with a defined group—the undefined group is potentially larger than a defined group. Enforcement risks, however, may also be increased if companies are protected by limited liability and asset sizes not stipulated. A company with smaller than viable asset size depending on the risk of getting caught and the penalties of contravention, may over-exploit rather than buy expensive additional shares. The possibility of over-exploitation with a long-term $TURF_{TAC}$ is, however, not great because harvesting activity is limited to a geographical area—the externality effects of harvesting more than the annual allowable catch are minimized.

4.6.2.4 Conclusions

If the distribution of the $TURF_{TAC}$ shares is considered unimportant, the $TURF_{TAC}$ system with tradable long-term shares is the most flexible. This comes at the cost of sacrificing the effectiveness of implementation and enforcement due to additional informational requirements. It also has the risk of establishing absentee sea lords and a speculative market for $TURF_{TAC}$ shares. The major effect of secure rights, which is positively related to the duration term in a tradable right, is to influence the value of each $TURF_{TAC}$ share. In tradable shares, the security of the right does not necessarily change harvest incentives. Rather, the more secure a right is, the greater the possibilities of increasing arbitrage value through speculative markets with exogenous environmental changes. The surety of the right thus also places a premium on future TAC levels that may lead to unwanted interference with otherwise objective scientific decision making.

When distribution is considered important and a select group of fishers is identified, the non-tradable $TURF_{TAC}$ system can, with minimum asset sizes and an appropriately long duration of term, result in technological, harvest and resource efficiency. In fact, this seems to be the most efficient TURF system available because i) harvesting externalities are usually absent and secure rights have the desired effect—individual fishers who can demarcate their fishing grounds have an incentive to practise fishing ground husbandry and thus to self enforce, ii) speculative markets do not form—the

resource rent accrues to the fisher and iii) the informational requirements for the effective implementation of a fisheries management system are minimized. The difficult part is establishing initial minimum asset sizes, the duration of term and an initial distribution that is considered fair.

4.6.3 $VESSEL_{TAC}$ Fisheries with No Redistribution Constraint

4.6.3.1 Introduction

The difference between the $VESSEL_{TAC}$ systems and the $TURF_{TAC}$ systems is that no geographical area is definable. The distinguishing characteristic of $VESSEL_{TAC}$ systems is that the 'right of participation' in quota shares is attached to the vessel. The primary division is again dependant on whether the state wants to restrict the 'right of participation' to a specific group of fishers or to allow any legal entity access to holding individual $VESSEL_{TAC}$ shares.

4.6.3.2 $VESSEL_{TAC}$ shares: individual fishers

In this option the group of people is limited to fishers who own vessels capable of harvesting the natural resource in question. Similar to $TURF_{TAC}$ shares that are not tradable, a minimum asset size is important; fishers must be able to cover the variable costs of their vessel. Also, the duration of term must be sufficiently long to allow fishers to cover the fixed costs of capital. Because larger vessels are involved, the minimum term would normally be longer than for the $TURF_{TAC}$ systems, but this also depends on the value of the landed catch. Because the $VESSEL_{TAC}$ shares are attached to particular vessels, this system is inflexible and does not encourage technological efficiency. The informational requirements for effective implementation are similar to those in a non-tradable $TURF_{TAC}$ system, but because fishing grounds cannot be geographically separated enforcement is more difficult and costly.

By adding the right to trade $VESSEL_{TAC}$ shares[8] between vessels (the shares are divisible and additive) the system can achieve technological efficiency. In this tradable option, fishers have the flexibility to select the optimum size and

[8] These are often called vessel ITQs or tradable vessel quotas TVQ.

characteristics of the vessel for the particular fishery in which they hold $VESSEL_{TAC}$ shares. Longer duration of term in this option not only adds value to the shares, but it also increases the flexibility of the system. The informational requirements for effective implementation are, however, greater than the non-tradable option. All trades need to be recorded for the fisheries management system to keep track of harvest levels. This obviously leads to higher enforcement costs. The trade-off between tradable and non-tradable $VESSEL_{TAC}$ systems lies between technological efficiency, on the one hand, and the effectiveness of the fisheries management system on the other.

4.6.3.3 $VESSEL_{TAC}$ shares: undefined group

$VESSEL_{TAC}$ systems with undefined groups, like the $TURF_{TAC}$ systems, have an inherent tradability built into their structure. Fishing firms can accumulate vessels and their attached quota shares; however, divisibility is limited to a single vessel. In other words, minimum asset sizes are important. Allowing inter-vessel quota trade (vessel quotas are divisible and additive) the system becomes more flexible and the opportunity for technological efficiency is maximized within the design parameters of the fishery. Minimum asset sizes are not important because fishing firms can accumulate vessel quota from a number of vessels and place then on a technologically superior vessel. This, however, opens the opportunity for speculative markets for vessel quota to develop. The duration of term is again unimportant; vessel owners can accumulate $VESSEL_{TAC}$ quota shares, to coincide with their efficiency plans, on a single term basis. Longer terms, however, add value to the $VESSEL_{TAC}$ quota share. Because the change in the annual harvesting right is expected to be greater with $VESSEL_{TAC}$ quota share of longer duration, it is expected that speculative activity will increase.

The informational requirements are greatly increased with undefined groups; again the fishing authority has to keep a record of all trades. When the $VESSEL_{TAC}$ are divisible and capable of consolidation, the informational requirements for effective implementation become more demanding. Enforcement also becomes more costly with increased flexibility.

4.6.3.4 Conclusions

The $VESSEL_{TAC}$ system is similar in most respects to the $TURF_{TAC}$ system but, because the group is not divided along geographical lines, greater informational requirements, necessary for effective implementation and enforcement, are required to efficiently implement the fisheries management plan. The flexibility of the system increases from a defined group without trade option to an undefined group with divisibility and additive trade options. As the system becomes progressively more flexible it allows for greater technological efficiency but at the cost of increased informational requirements and less effective implementation and enforcement. As the effectiveness of implementation and enforcement is eroded, the ability to recover fisheries management costs from the $VESSEL_{TAC}$ becomes more difficult, another consequence of the increased informational requirements. Also, as speculative markets develop the resource rent is dissipated to non-fishing speculators in search of arbitrage and the likelihood of absentee sea lords emerging is increased.

4.6.4 $UNATTACHED_{TAC}$ Fisheries with No Redistribution Constraint

4.6.4.1 Introduction

$UNATTACHED_{TAC}$ systems do not link the awarding of a quota share to a specific vessel or TURF—they have intrinsic flexibility. The quota shareholder can choose the vessel, thus also its technical characteristics, best suited to the quota share asset size. If the state is concerned with the distributional characteristics of the fishery it can, like in the other cases, restrict the 'right of participation' to fishers only.

4.6.4.2 $UNATTACHED_{TAC}$ shares: individual fishers

By restricting 'right of participation' only to individual fishers, non-tradable $UNATTACHED_{TAC}$ quota shares might have to be awarded to fishers according to some standard minimum asset size. In this case, each fisher will have the incentive to select a profit-maximizing technological set of options within an asset size constraint. Alternatively, the state must depend on fishers pooling their quota shares make up minimum asset sizes. This option increases transaction costs and fishers will tend to pool quota shares to fit a specific vessel size, weakening the incentives to create technological efficiency and the resource rent will probably be dissipated in transaction costs.

If minimum asset sizes are considered important, for example to avoid excessive transaction costs and to encourage technological efficiency, the design parameters become more severe. If the asset sizes are too small, fishers will over-harvest in the short-term to cover variable costs and even more so if they cannot easily scale down the technologically efficient vessel size in the long term.

Additional information is needed to: i) keep records of active versus non-active fishing vessels, ii) assess what quota shares are being fished on what vessels and iii) establish in the pooling option what portions of individual quota $UNATTACHED_{TAC}$ shares are being harvested on what vessel. This adds to the costs of an effective fisheries management and enforcement. The policing function is increased because, although the fishery authorities are dealing with a defined group of fishers, they are not constrained to a defined group of vessels.

By allowing $UNATTACHED_{TAC}$ quota shares to be traded among individual fishers, minimum asset sizes are not important because fishers can divide or add to their quota share according to their preferred technological choice. In other words, tradable $UNATTACHED_{TAC}$ quota shares result in a technologically more efficient solution than non-tradable ones. Transaction costs are also probably smaller than in the pooling option. Although the informational requirements for the fisheries management system and enforcements functions are similar to the non-tradable option, minimum asset size design problems are removed. With a 'right of participation' restriction the tradable $UNATTACHED_{TAC}$ system is more efficient than the non-tradable $UNATTACHED_{TAC}$ option.

4.6.4.3 $UNATTACHED_{TAC}$ shares: undefined group

First non-tradable $UNATTACHED_{TAC}$ quota share systems with no 'right of participation' restriction defining an approved fishing group result in either i) a portion of the TAC not being utilized if awarded to non-fishing companies or ii) an equivalence to tradable $UNATTACHED_{TAC}$ quota share systems restricting the 'right of participation' to a defined fishing group. No rational state authority would accept the former and the latter is discussed above.

Being the most flexible option, a number of different outcomes, or a mix of outcomes, is possible with a tradable UNATTACHED$_{TAC}$ quota share system and no defined group. In essence what this option does is to change quota shares into a market instrument (paper quotas). At the one end of the spectrum quota shares may become concentrated into 'quota holding' companies with the sole purpose of extracting resource rents and arbitrage. In between, i) fishing companies can develop oligopolistic, even monopolistic, market positions or ii) fish processing and marketing companies can develop monopsonistic markets, or iii) fishing, processing and marketing companies can vertically integrate and command significant market power. At the other end of the spectrum, competitive quota share trade among fishers will result in allocative efficiencies, but the probability of this outcome occurring is greater with attached quota share options. Due to the high-risk nature of fishing, particularly in the more capital intensive large to very large vessel fisheries, the emergence of market power is highly probable.

The extreme flexibility of the system substantially increases the informational requirements and thus also the costs of effective management and enforcement. However, a more concentrated market structure will result in lower informational requirements and easier enforcement. This example highlights the trade-offs between flexibility, market structure and effective implementation and enforcement.

4.6.5 Conclusion

The design problems inherent in the fishery dictate that fisheries have to be managed and that efficient fisheries management systems first require that individual incentives be aligned to the fisheries management plan in the design stage (structure of individual fishing rights). The structure of individual fishing rights determines the informational requirements needed for effective implementation and enforcement including capacity management.

The flexibility increases with less restrictive operational rules and allows private economic agents in the fishery the adaptability to achieve technological efficiency. However, the more flexible the system becomes, the greater the informational requirements are to effectively implement the fisheries management system and to effectively enforce harvest restrictions within the design parameters of the system (the

TAC and the capacity to harvest the TAC). In the design stage, system's efficiency dictates that flexibility has to be traded off against its increased informational requirements.

Tradable individual fishing rights provide a great deal of flexibility and they remove the necessity to establish minimum asset size criteria, which is an additional design problem[9]. In this case, applying an attachment criteria[10] and the 'right of ownership' operational rule is an effective way of trading flexibility for informational requirements. The flexibility of the system increases from a $TURF_{TAC}$ to a $VESSEL_{TAC}$ and finally to an $UNATTACHED_{TAC}$. If the 'right of participation' targets fishers and excludes everybody else, the informational requirements are reduced and technological efficiency is possible. The application of this operational rule also has distributional consequences, restricting fishing activities to fishers. The duration of term in tradable individual fishing rights increases their value and thus also their tradability with longer terms and as a consequence improves the security of the right. The group of tradable individual rights is usually termed individual transferable quotas or ITQs. The important point is that not all ITQs are identical, and that careful consideration should be given to designing the structure of rights in each particular fishery with its own unique characteristics.

Non-tradable rights are usually used to ensure a desired distributional structure, but also technological, harvest and system efficiencies can be achieved with non-tradable rights. These efficiency outcomes are all dependant on the ability to establish quota shares at a minimum asset size. This design problem is crucial; if asset units are set too low fishers will have incentives to overexploit and too many fishing vessels will be allowed into the fishery resulting in over-capacity and enforcement problems. From an efficiency point of view, the design problems in establishing minimum asset sizes must be weighed against the advantages of a very low informational requirement that leads to the effective implementation of the fisheries management system and in particular the enforcement function.

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[9] The number of individual quota shares is determined by dividing the TAC into minimum asset sizes.
[10] The rights are attached, for example to a geographical area ($TURF_{TAC}$) and/or a fishing vessel ($VESSEL_{TAC}$).

From a state revenue collection point of view, by virtue of the informational requirements of a clearly defined group, inflexible systems are administratively easier than flexible ones. The most efficient instrument for an inflexible system is a levy on landed catch mainly because fishing operations are not separated from the quota shareholder. At the other end of the scale, however, unattached tradable quota shares have real market value and the quota shareholder might not necessarily be the fisher. Placing a levy on landed catch places the burden on the fisher who may or may not be able to pass the burden onto the quota shareholder. Quota pricing instruments are more equitable and will tend to capture at least a portion of the resource rent for the state, leaving quota share speculators the ability to gain arbitrage on uncertainty rather than risk. Depending on the design and type of auction used and assuming that distribution is unimportant, auction-pricing mechanisms have the ability to get bidders to reveal their true valuation of the quota share. Marginal cost pricing, if correctly formulated, is an equivalent system to auctions but it transfers risk onto the state. With options falling within the two extremes, a mix of the two instruments might be feasible.

4.7 STRUCTURE: EXAMPLES

According to Gissurason (2000 7-10), in the demersal fishery (medium to large vessel fishery) Iceland issued tradable quota shares[11] for an indefinite term to vessels. Tradability is, however, limited to trades between vessels of common ownership, or attempts to stabilize local employment in the same region with comparative fishing power (Shotton, 2000:48). Trade in $VESSEL_{TAC}$ shares has to be registered and approved by the Fisheries Directorate under the Ministry of Fisheries. Because quota shares are allocated for an indefinite period and the TAC is set yearly, annual catch entitlements as a portion of the current year's TAC can be traded through a Quota Exchange. The annual catch entitlement is divisible, but limited to less than 50% of a vessel's annual share. Also, the vessel will lose its quota share if it harvest less than 50% of its annual catch entitlement in two consecutive years.

[11] Quota shares for a number of different species are allocated to a vessel and are measured in cod equivalents using relative prices.

The effectiveness of Iceland's informational and enforcement functions is approached after Gissurason (2000 7-10) as follows. Catch is weighed, and species verified, at the landing site by municipal authorities; they charge a weighing fee to cover costs. The information is transmitted electronically to the Fisheries Directorate, who hold information on quota shareholders and annual catch entitlements for the vessels. The Fisheries Directorate is responsible for administering the fisheries management system. The Ministry of Fisheries also uses observers on vessels to ensure compliance with gear and closed area restrictions. The Icelandic Coastguard also monitors vessels at sea. The Marine Research Institute calculates the TAC. On the whole, flexibility in the Icelandic system is limited through the application of a $VESSEL_{TAC}$ system and additional regulations—this limits the size of the fishing fleet and therefore its fishing capacity. The fisheries management system is informationally efficient allowing the effective implementation of the fisheries plan and enforcement. The weak link is the ability of the Minister of Fisheries to alter the TAC for economic (usually employment) or political reasons. This has occurred to the detriment of the fishery.

In Norway, access is limited by controlling the vessels, allocating vessel quota shares and limiting people who own and operate the vessels. Only fishers meeting certain criteria and registered in the 'Fisherman's Register' are allowed to own and operate a fishing vessel and fishing vessels may only be traded, along with their quota share, to registered fishers (Williams & Hammer 2000:195). The United States Alaskan halibut and sablefish fisheries allow trade in quota share but only to people who were initially awarded rights or those with a Transfer Eligibility Certificate, that is, they must have at least 150 days fishing experience as a member of a harvesting crew in any United States commercial fishery (Smith, 2000:166-171). Smith (2000:171) also points out that because of the large number of restrictions on different vessel categories coupled with concentration limits on both quota shares accumulations and vessel ownership, the informational requirements for an effective implementation and enforcement of the fisheries management plan have grown substantially, requiring more government involvement.

Similarly, 'right of participation' is limited to vessel owners and trawl operators in the Australian southern blue fin tuna fishery and the south-east trawl fishery respectively

(Shotton, 2000:48). Most New Zealand fisheries are based on $UNATTACHED_{TAC}$ quota shares, limited to New Zealand citizens (Shotton, 2000:48), but legal challenges to fairness of initial quota share allocations at first made the implementation of the system difficult (Nielander and Sullivan, 2000: 59-71).

4.8 STRUCTURE: WITH A REDISTRIBUTION CONSTRAINT

The introduction of a redistribution constraint places limitations on the structural design of individual fishing rights. First, however, a distinction is made between a weak and a strong redistribution constraint. A weak redistribution constraint focuses only on redistributing individual fishing rights from one group to another, in effect a transfer of resource rents. A strong redistribution constraint allows for the redistribution of fishing capital, namely fishing vessels, as well as individual fishing rights and fishing skills.

All tradable structures allow the sale of individual fishing rights from one group to another, thus they all display—but are not necessarily confined to—weak redistribution characteristics. Tradable $TURF_{TAC}$ and $VESSEL_{TAC}$ with a 'right of participation' restriction on fishers can be used to transfer resource rents from one group of fishers to another group of fishers. This option is useful for broadening access in a highly concentrated fishery. However, because the attachment and right of participation criteria limit the benefiting group to existing skilled fishers, strong redistribution might occur if members of the beneficiary group choose to buy their own fishing vessels. In the tradable $UNATTACHED_{TAC}$ structures, the beneficiaries are not a definable group. Because fishing skills and fishing capital are both highly specific and fishing is a risky business, it makes sense for the benefiting group to simply trade their quota shares for the highest price. This is in effect a risk-free transfer of a portion of the resource rent. It would be more equitable to place a surcharge on the income tax (a royalty tax) of fishers, or fishing companies. The revenue can be used for either focused or more broad-based redistribution agendas of the state.

The non-tradable structures with attachment criteria ($TURF_{TAC}$ and $VESSEL_{TAC}$) are better suited to strong redistribution constraints. For example, a recipient of a

redistributed non-tradable $VESSEL_{TAC}$ quota share can only realize value by buying or leasing a fishing vessel. The duration of term will influence the new quota holder's decision on whether to buy or lease a fishing vessel. A long-term non-tradable $TURF_{TAC}$ or $VESSEL_{TAC}$ quota share with the 'right of participation' restricted to fishers (which does away with a skills constraint and the tradability of companies) results in one of the strongest forms of redistribution. A redistributed non-tradable $UNATTACHED_{TAC}$ quota share, if awarded to a non-fishing individual (with a fishing skills constraint), is only useful if leased to the owner of a fishing vessel or in a joint venture arrangement. The leasing option is the less risky one.

4.9 SOUTH AFRICA: STRUCTURE AND REDISTRIBUTION

The structural and redistribution aspects of the six South African TAC fisheries that this thesis is concerned with are discussed in chapter 3, but are summarized again below. Historically, all six major South African TAC fisheries developed the same structure of individual fishing rights, namely $UNATTACHED_{TAC}$ quota share allocated on a yearly basis to companies and individuals. Although no strict attachment criteria apply to either vessels or fishers, MCM encourages through their yearly quota share renewal system certain 'investments' to be made in the fishery. These investments can be in processing and marketing companies and/or fishing vessels. Fish processing companies are limited by licence—the result of an early attempt to restrict harvest by controlling the amount of fish processed. The quota shares are tradable in that companies can, without the permission of MCM, be bought and sold with their quota shares. Quota shares can also be leased, with the permission of MCM, which in effect makes them fully tradable particularly if allocated for only one year. In addition, no consideration is given to minimum asset sizes of quota share distributions. In fact, many quota shares are awarded in sub-economic asset sizes that make trade or joint venture arrangements a necessity.

Basically, the structure of South African individual fishing rights falls on the flexibility extreme on the spectrum of possible options. Based on figure 4.2 (section 4.3), illustrating the fundamental dual form of individual fishing rights, figure 4.4 extends the form of rights in the South African TAC fisheries to include the operational rules, or its structure of individual fishing rights.

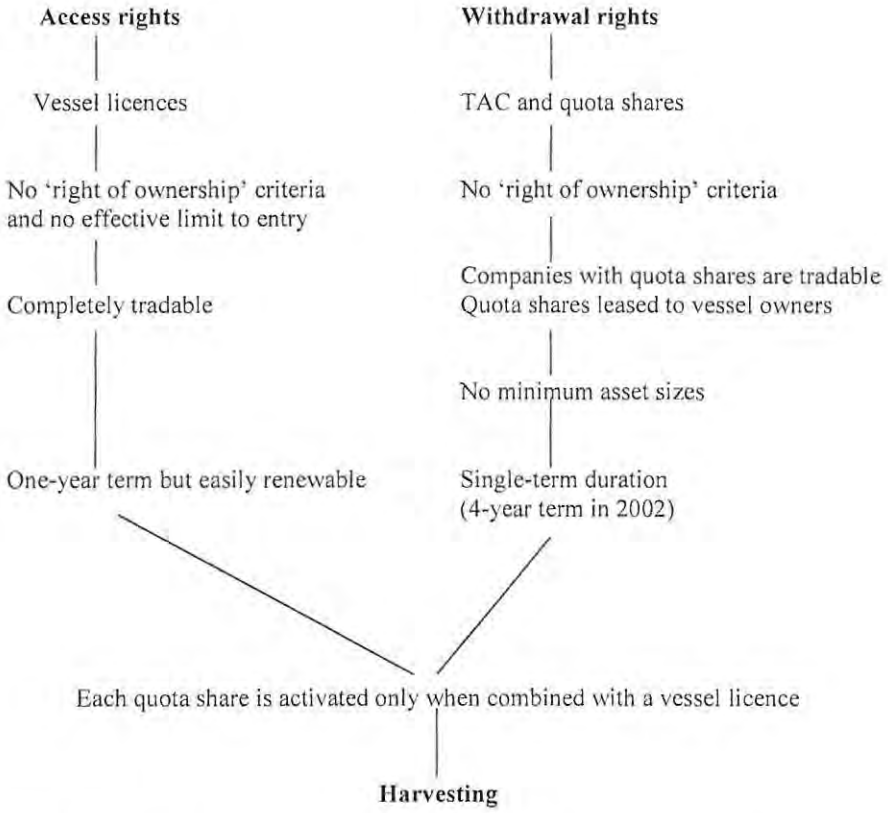

Figure 4.4: The dual structure of individual fishing rights for the South African commercial TAC fisheries.

Bear in mind that in the fishery, flexible systems require more information for effective management than inflexible ones. From a biological information point of view the informational requirements to establish the environmental constraint rely on catch returns (documenting the amount and species harvested) completed by fishing vessels and posted to MCM. Enforcement of this catch return system seems to rely on a threat of punishment, namely reducing the probability of not getting a quota share allocation the following year. The economic information necessary to efficiently implement and enforce the biological constraint includes a record of all trades in fishing vessels and fishing companies, all quota shares leased, what quota shares are used on what vessels, the prices of quota share trades, raw fish prices and vessel cost data. This information, let alone analysis of the information, is not available from MCM (Adams, 2002: pers comms)

In South Africa, harvest enforcement is based on reliable policing and inadequate information, namely, by policing the point of landing, observer programmes on the larger vessels and limited sea patrols. The resource management requirements, in the form of biological data and analysis, still remain the central thrust in information gathering and decision-making at MCM—to the extent that scientists responsible for biological analysis use the catch data not only to do biological analyses but also to implement as far as is possible the management plan (Tilney, 2003:pers comms). In effect the right to harvest is awarded separately to quota holders, but information is gathered only from access rights holders (the vessel owners).

Almost since the first distribution of quota shares in the mid-1970s they have been subject to redistribution pressures. First, using an independent Quota Board quota shares were redistributed under the auspices of broadening access. After 1994 the redistribution of quota shares to individuals from historically disadvantaged groups gained significance under the Interim Quota Board. The implementing authority, MCM, is now faced with some serious inherited impediments to achieving the redistribution goal. Some of the more important ones are listed below.

a Historically South Africa developed one of the most flexible quota management systems possible. Information collection and analysis of non-biological data is, however, both inefficient and insufficient.

b The flexibility of the quota management system, coupled with a dual structure of individual fishing rights, places severe limitations on successfully achieving a redistribution of fishing capital.

c The apartheid regime effectively reduced the skills and capital base of black South Africans[12]. This places another severe constraint on the successful redistribution of fishing capital.

The flexible structure of tradable rights, the dual system of rights, the large informational requirements to successfully monitor any redistribution attempt and the lack of a skills and capital base among black South Africans create a weak redistribution effect. In other words, only tradable quota shares, where trades are difficult to track, are redistributed and these shares carry inherent incentives to be sold

[12] Black South Africans include individuals who are of African, Asian, and mixed origin.

or leased. The division of quota shares into sub-economic asset sizes, at least from a feasible vessel point of view, enhances this effect.

4.10 CONCLUSION

The design of individual fishing rights determines the flexibility of the system which gives rise to patterns of incentives that influence the ability of the fisheries authorities to effectively implement and enforce the fisheries management plan. The more flexible a system is, the more closely it resembles a competitive market structure, where with no design problems (private goods and no externalities) economic goods and services are efficiently allocated. This chapter highlights the trade-off between informational efficiency in implementation and enforcement against the flexibility of the system. Because of the substantial design problems, enforcement difficulties and increased informational requirements of a flexible system, most developed world fisheries limit the 'right of participation' of individual fishing rights to a specific group, usually based on vessel ownership and accredited fishers. With a redistribution constraint, successful strong redistribution where both individual fishing rights and fishing capital are redistributed according to some plan is more possible with an inflexible system.

The South African structure of individual fishing rights with a separation of access rights from withdrawal rights and which developed in response to historical forces, is one of the most flexible systems possible. Accordingly, the informational requirements are very high for effective implementation and enforcement of the plan, but the capacity of MCM to collect and analyze this information is very limited at present—most informational analysis is biological. The redistribution agenda is targeted on the redistribution of tradable $\text{UNATTACHED}_{\text{TAC}}$ quota shares of limited duration and usually of sub-economic asset sizes. The redistribution of fishing capital (fishing vessels and processing and marketing activities) is left to the market in the belief that, by redistributing the resource rent through tradable (leased) quota shares, the 'new quota holders' will automatically invest their risk-free flow of income in fishing capital. The next chapter examines the distribution patterns in both quota share and access rights (in the form of fishing vessels) for the six main South African TAC fisheries.

CHAPTER FIVE
MICRO TO SMALL VESSEL TAC FISHERIES

5.1 INTRODUCTION

The purpose of this chapter is to provide more detail on the micro to small vessel TAC fisheries in South Africa, namely, those fisheries that use fishing vessels 14m or smaller in length. This group is made up of the abalone fishery and the west coast rock lobster fishery. The major aim is to determine, within the available data, the effect that a weak redistribution policy, namely, redistributing quota shares and thus only the resource rent, has had on strong redistribution. Strong redistribution, as is introduced in chapter 4, allows for the transfer of human skills and the redistribution of fishing capital. The package of quota share (resource rent) redistribution, human skills transfer and fishing capital redistribution, or strong redistribution, is called 'fishing industry transformation[1]' in South Africa.

To arrive at a clearer picture of strong redistribution within the two fisheries, each is described in terms of the following[2]:

a An overview of the fishery. In the micro to small vessel fisheries both have a recreational and subsistence component, as well as an illegal one. These are briefly discussed. Details are provided on demarcated fishing zones, the different products produced and various other facts that characterize the fishery.

b A time series of the structure and harvesting capacity of the fishing fleet for each fishery. This gives an indication of the kind of access rights that are available, their value and some input into the probable efficiency of the fisheries management system.

c Access right distribution patterns are examined within the three different quota share redistributing institutions discussed in chapter 2, namely the Quota

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[1] In the economics literature, transformation usually refers to the structural transformation of the basic industrial structure of an economy where the contribution to national income by the manufacturing sector increasingly becomes higher than the contribution of the agricultural (including fisheries) sector (Todaro, 1997:721).

[2] Data for the various fisheries are sourced from the Fishing Industry Hand Books (1992 to 2002) [Stuttaford, (1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999 & 2000) and Warman, (2001& 2002)] and are accordingly referenced as FIHB (1992 to 2000) unless otherwise stipulated.

Board, the Interim Quota Board and the Marine Living Resources Act of 1998. To recap briefly, the Quota Board and Interim Quota Board (which existed during the Fishing Policy Development Committee until the passing of the new Act) were independent institutions that awarded quota shares on the basis of an established set of rules. Under the Marine Living Resources Act, the quota share distribution mechanism was placed more into the public choice arena by providing wide reaching powers to the Minister of Environmental Affairs and Tourism.

d The skills distribution is examined using survey data from the year 2000. Here the racial distribution is measured using a demographically adjusted proportion of Black skilled fishers weighted by a racial income differential.

e The quota share distribution, being the major instrument used by the South African fisheries authority to achieve redistribution, is again viewed across the three redistribution institutions. As is highlighted in chapter 4, the asset sizes of the quota shares are crucially important, particularly from a strong redistribution point of view. Accordingly, the distribution of asset sizes is examined along with the distribution of quota shares.

f Both power and control characterize the South African fishing industry. The concentration of access rights and quota shares is examined within the context of the individual company and the consolidated company (a derived structure of South Africa's consolidated fishing companies is presented in appendix A3), vessel ownership and quota share holdings.

This chapter concludes by comparing the micro to small vessel fisheries, with particular emphasis on concentration and control (distributional trends) and strong and weak redistribution. Finally policy options are provided in terms of the design and management of efficient micro-economy systems with redistribution constraints. The general structure chapter is also used for the medium to large vessel fisheries (chapter 6) and the very large vessel fisheries (chapter 7).

5.2 OVERVIEW: THE ABALONE FISHERY

According to Pulfrich (2001: 3-4), the abalone (*Haliotis midae*) fishery is based on sub-tidal stocks and extends between Cape Columbine and Quoin Point just east of Cape Agulhas (map A4.1 in appendix A4). Since 1986, in an attempt to balance

fishing effort, seven commercial abalone-fishing zones, similar to TURFs but not demarcated as individual TURFs, were established; each zone is assigned an annual total allowable catch (table 5.1). Other restrictions include a minimum legal size of 138 mm shell length (114 mm shell breadth) and a fishing season from 1 November to 31 July.

The distribution of the TAC between the eight zones from the 1985/86 fishing season to the 2000/2001 fishing season is illustrated on table 5.1 below. Most abalone is harvested between Quoin Point and Cape Hangklip, (Zones A-D). The partially protected areas of Dyer Island in Zone A and Robben Island (Zone F) are fished over a short pre-arranged period, before the areas are closed again for the rest of the season.

Table 5.1: Annual distribution of the abalone TAC, in tons, for the commercial fishing zones (A-G) and Dyer Island between the 1985/86 and 2000/2001 fishing season.

	Zone								
Fishing season (years)	A	B	Dyer Island	C	D	E	F	G	Total
	Buffelsjag	Gans-baai		Mudge Point	Klein-mond	Cape Point	Robben Island	West Coast	
1985/86	-	-	-	-	-	-	50	-	-
1986/87	180	160	0	160	40	20	50	30	640
1987/88	190	140	0	160	50	20	50	30	640
1988/89	190	140	0	160	50	20	50	30	640
1989/90	195	140	0	170	50	20	50	0	625
1990/91	195	140	0	170	50	10	30	0	595
1991/92	195	145	25	150	55	0	30	0	600
1992/93	195	150	25	150	55	0	30	0	605
1993/94	195	150	25	140	90	0	15	0	615
1994/95	205	150	25	130	90	0	15	0	615
1995/96	205	150	25	130	90	0	15	0	615
1996/97	205	150	25	65	90	0	15	0	550
1997/98	185	150	25	30	105	5	15	15	530
1998/99	185	150	25	15	105	5	15	15	515
1999/2000	185	145	25	5	105	5	15	15	500
2000/01	158	113	25	0	35	5	20	15	371

Source: Pulfrich (2001:5)

Fishing is undertaken by divers working at a depth of less than 10 metres who collect individual abalone by prising them from the rocks using a regulated tool: a flat, blunt

blade. The divers operate from micro to small vessels and are usually assisted by a boat handler and two boat assistants[3] who tend the diving equipment and check the catch for undersized abalone. Because divers can only operate during good weather and calm seas, fishing only takes place on average between three to five days a month. Each diving day consists of numerous short dives totalling between three to five hours (Pulfrich, 2001:12).

The day's catch is landed at the nearest stipulated launch site where it is weighed on specially provided scales and recorded by a fisheries control officer. The abalone are then loaded onto a vehicle with an abalone transport permit, documented again and sealed by the fisheries control officer. At the processing factory the seal is broken and the documentation crosschecked. Since 1998, harvesters were legally required to deliver their catches to one or more of the seven factories holding processing rights (Pulfrich, 2001, 14). Live abalone has to be sealed at the slipway[4] before being transported. At the processing factory the abalone are canned, frozen, dried or marketed live.

According to Pulfrich (2001:17-19), during the 2000/2001 fishing season and depending on the contracting processing company, divers (vessel owners and small quota share holders) received between R12 and R20 per kilogram of abalone. For example, during the 2000/2001 fishing season:

a The divers associated with the Overberg Commercial Abalone Divers Ltd and the South African Commercial Fishermen's Corporation received a price of R20 per kilogram.

b The divers who deliver to companies with processing licences (Tuna Marine and Walker Bay Canners, for example) get between R13 and R17 per kilogram and a contract to harvest part of the factories' quota-share.

- For every one kilogram a South African Commercial Fishermen's Corporation diver delivers at a price of R13 to Tuna Marine for

[3] One is usually an assistant diver, but only one diver may operate from a vessel during any one day. This means that the diver who is also a quota shareholder may employ an assistant diver to harvest the abalone. Since 1991-1992 divers were for the first time permitted to employ assistant divers.

[4] A regulation introduced in response to an increase in the export of live abalone and to prevent the possible sale of illegal abalone.

processing, he gets contracted to fish 1.5 kilograms of Tuna Marine's quota share.

- Walker Bay Canners paid a price of R17 per kilogram to divers associated with Overberg Commercial Abalone Divers Ltd. These divers are then contracted to harvest an additional 60-65% of their delivery weight from the Walker Bay quota share.

c Some smaller quota holders not allied with either association also had similar agreements with the processing companies.

The amount received by the divers is usually split between the diver (50%), skipper (30%) and the two assistants (10% each). (Pulfrich, 2001:17-19).

The recreational fishery began as an open access one, but was restricted by a daily bag limit of five abalone per person and a size limit of 114 mm shell breadth (138 mm shell length). During 1983, recreational permits were introduced and in 1985 a three-month closed season was imposed. The bag limit was reduced in 1991 to four abalone per person. (Pulfrich, 2000:20).

Table 5.2: Recreational catches of abalone (1993/94 and 1999/2000).

Fishing season	Number of Permits	Catch (tons)
1993/94	33 088	753
1994/95	34 307	616
1995/96	33 205	595
1996/97	35 215	680
1997/98	22 315	302
1998/99	14 368	123
1999/2000	22 127	212
2000/2001	16 995	107

Source: Pulfrich (2000:20)

The catch from the recreational fishery peaked at over 750 tons (122% of the commercial TAC) in the 1993/1994 season. The Minister, however, stopped the sale of further recreational permits for the 1997/1998 season and changed the fishing time to weekends and public holidays only. The recreational catch dropped to an estimated 302 tons. A reduction to a four-month fishing season the following year further reduced the estimated recreational catch to 123 tons. Many recreational fishers sell their catch to restaurants.

The Marine Living Resources Act of 1998 for the first time gave recognition to a group classified as subsistence fishers. The permit system adopted for the abalone subsistence fishery allowed a daily bag limit of four abalone, but catch could be only sold to end-users. A total of 236 permits were issued during the 1998/99 season. Over 850 applicants were received for the 208 subsistence permits awarded for the 2001/2002 season. A further 53 small-scale (limited) commercial permits to fish 45 tons of abalone were introduced for the 1999/2000 season. The total tonnage for limited commercial permits increased to 62.5 during the 2000/2001 season. (Pulfrich, 2000:21-23). Four-year individual abalone fishing rights were distributed during 2002 to 173 individual as limited commercial quota shares of 430 kilograms each.

Finally, Pulfrich (2001:24-25) estimates that between 1 600 and 1 750 tons (between four and four and a half times the commercial TAC) of illegally caught abalone are exported annually to various countries in the Far East. Further, an estimated 55% of the illegal catch is below the minimum legal size, which creates a potential for the total collapse of the commercial and recreational fisheries.

5.3 STRUCTURE OF THE FLEET: ABALONE FISHERY

The purpose of this section is to give a brief overview of the structure of the fishing fleet licensed to harvest abalone. Most fishing vessels operating in the micro to small vessel fisheries hold a number of access rights, or licences, to harvest more than one species. These are called multi-species fishing vessels. The multi-species nature of the abalone fishery fleet is presented in table 5.3 below. Abalone (Ab) fishing vessels usually hold either hand-line (Hl) and/or tuna (Tu) effort licences. The effort licences are attached to the fishing vessel. The quota shares for abalone harvesting are not attached to the abalone vessel—this is illustrated later in the chapter.

Table 5.3: The multi-species nature of the abalone fishing fleet (1993 to 2001).

	1993	1994	1995	1996	1997	1998	1999	2000	2001
Ab			6%	9%	8%		7%	2%	2%
Hl,Ab	97%	95%	89%	86%	86%	96%	88%	94%	96%
Ab,Tu			2%	2%	2%		2%		
Hl,Ab,Tu	3%	5%	3%	4%	3%	4%	3%	4%	2%

Ab: abalone licence, Hl: hand-line effort licence, Tu: Tuna effort licence
Data source: FIHB (1992 to 2002)

The main part of the abalone fishing fleet (ranging between 97% to 86%) holds line-fish effort licences[5]. Some vessels are dedicated abalone vessels, while a small proportion of the fleet also harvests tuna.

The trends showing the structure of the abalone fleet in terms of its average vessel length, the number of fishers and the number of vessels is illustrated on figure 5.1 below.

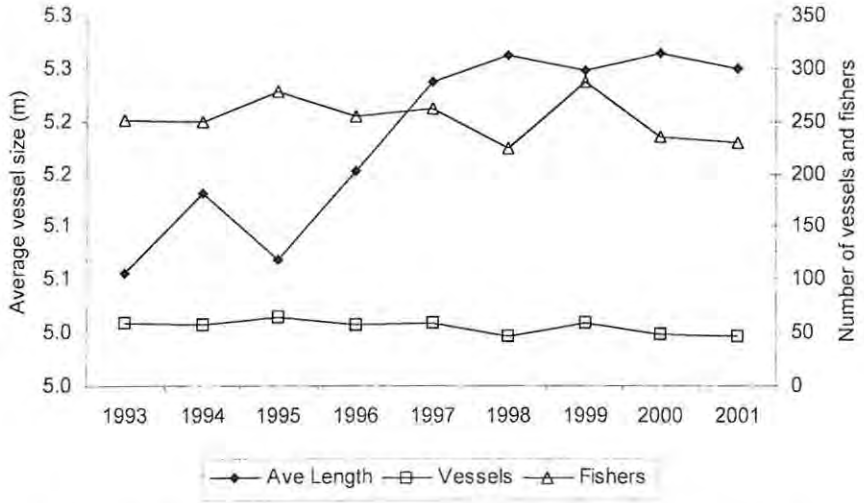

Figure 5.1: The average length and number of vessels and fishers in the abalone fishery (1993 to 2001).
Data source: FIHB (1993 to 2002)

Figure 5.1 shows that the average length of the vessels increased from around 5.1m to 5.3 m between 1995 and 1997—during the Interim Quota Board time. In addition, the number of vessels with access rights to the abalone fishery decreased from 60 in 1993 to 47 in 2001. This slight structural change may be interpreted in a number of ways. One possible explanation, however, is that a consistently decreasing TAC coupled with the increased demand for higher-priced live abalone resulted in a change to a more efficient slightly larger vessel size. More detail on the structure of the fleet is provided on table 5.4 below.

[5] Line-fish effort licences are attached to a vessel. The absolute number of these licences has been drastically reduced by MCM, but the figures were not available at the time of writing this thesis.

Table 5.4: Structure of the abalone fishing fleet 1993 to 2001 (median size highlighted).

		Fishing season								
		1993	1994	1995	1996	1997	1998	1999	2000	2001
3m to 5m (micro)	Average Length	4.8	4.7	4.7	4.8	4.8	4.8	4.8	4.8	4.8
	Vessels	41	39	41	33	30	23	29	23	22
	Fishers	154	147	158	130	111	97	122	98	94
>5m to 8m (micro)	Ave Length	5.7	5.7	5.6	5.6	5.7	5.7	5.7	5.7	5.7
	Vessels	19	18	24	25	30	23	30	25	25
	Fishers	97	91	120	124	151	128	165	137	135
>8m to 12m (small)	Ave Length		10.0							
	Vessels		1							
	Fishers		12							

Source: FIHB (1992 to 2002)

What is clear from table 5.4 is that the vessels in the abalone fishery all fall into the micro-sized vessel category. The change in the size structure is accounted for by the decrease in the number of vessels between three to five metres (from 41 to 22) and the increase from 19 vessels to 25 vessels in the next size group (>5m to 8m).

The harvest capacity of the abalone micro-sized vessel fleet is estimated[6] at 6.7 tons per year for 3m to 5m vessels and 13.9 tons per year for >5m to 8m. Based on these assumptions, the estimated harvesting capacity of the abalone fishing fleet is presented in table 5.5.

Table 5.5: The estimated harvesting capacity of the commercial abalone fishing fleet (tons).

	Harvesting capacity (tons)								
	1993	1994	1995	1996	1997	1998	1999	2000	2001
Capacity 3m-5m	274.7	261.3	274.7	221.1	201.0	154.1	194.3	154.1	147.4
Capacity >5m-8m	264.1	250.2	333.6	347.5	417.0	319.7	417.0	347.5	347.5
Total capacity	538.8	511.5	608.3	568.6	618.0	473.8	611.3	501.6	494.9
TAC	605.0	615.0	615.0	614.9	550.0	530.0	500.0	371.0	388.4
Over/under capacity	66.2	103.5	6.7	46.3	-68.0	56.2	-111.3	-130.6	-106.5
Fishing vessels	60	58	65	58	60	46	59	48	47

Data source: FIHB (1992 to 2002) and Mather et al (2002)

Using the above estimates, the abalone fishing fleet experienced harvesting over-capacity problems in the years 1997, 1999, 2000 and 2001. Between 1996 and 1997,

[6] The ESS (2002) estimate shows a drastic under-capacity in the abalone fishery, but this is unrealistic. Pulfrich's (2001) figures on days at sea for the year 2000 are used (27 days a year for 3m–5m vessels fishing for 4 hours per day and 45 days for >5m to 8m vessels fishing for 5 hours a day). Assuming that only the TAC is harvested, the 3m-5m vessels catch 6.7 tons of abalone a year and the >5m to 8m vessels 13.9 tons per year.

coupled with a fall in the TAC, three 3m-5m vessels dropped out and were replaced by five >5m-8m vessels. Although the TAC rose in 1998, 14 vessels dropped out of the fishery between 1997 and 1998. Since 1998 the TAC dropped consistently and the 3m-5m vessels were replaced with larger >5m-8m vessels, again resulting in an estimated harvesting overcapacity.

5.4 ACCESS RIGHTS: ABALONE FISHERY

The change in ownership of vessels licensed to harvest abalone provides an indication of the potential for redistribution of access rights—access rights, but not quota shares, are attached to vessels participating in the South African TAC fisheries. Access right redistribution is an important variable when assessing the potential for strong redistribution in the fishery. To recap, strong redistribution includes the redistribution of resource rent (achieved through redistribution quota shares), skills transfer and the redistribution of fishing capital (redistribution of wealth).

The data sourced from the Fishing Industry Hand Book (1993 to 2002) provides lists of individual ownership of vessels licensed to harvest abalone. It is difficult to determine the origin (race) of the vessel owner. Although not ideal, the entry of new vessel owners (new entrants) into the fishery from 1994 is considered to be an indication of the ability for wealth redistribution to occur in that fishery. The replacement of companies or individuals that held access rights in 1993 with new entrant companies is illustrated on figure 5.2 below.

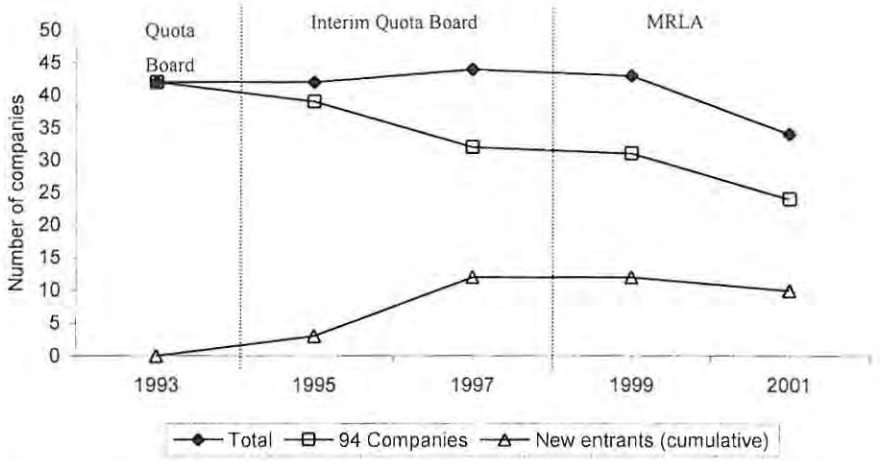

Figure 5.2: Change in abalone access right holding companies or individuals from 1993 to 2001.
Data source: FIHB (1992 to 2002)

Figure 5.2 highlights that the number of new entrant access right holding individuals, or companies, increased relatively rapidly until 1997. The total number of access right holders decreased under the jurisdiction of the Marine Living Resources Act. This, however, is not necessarily a result of policy, as the TAC consistently fell during these years and the average size (presumably also the average efficiency) of the vessels also increased. In other words, with less to catch and with more efficient vessels, the total number of access rights must of necessity fall.

The distribution of access rights in the form of licensed vessels is not as strongly controlled as is the distribution of quota shares. However, the distributional characteristics of quota shares will to some extent have an effect on the distribution of access rights in this micro vessel fishery. This issue is dealt with later. What is important in this section is to plot the number of new access rights holders, or vessel owners, that have entered the fishery over a certain period of time. As was illustrated previously, both the TAC and the harvesting capacity of the fleet influence the number of vessels entering into the fishery. Table 5.6 provides more detail on these patterns of entry and exit of access right holders (vessel owners or lessees) into or out of the abalone fishery.

Table 5.6: Companies holding access rights to the abalone fishery between 1993 and 2001.

		1993	1995	1997	1999	2001
New entrant companies	Companies		3	9	0	1
	Vessels		3	9	0	1
	Fishers		13	40	0	5
New entrant companies (cumulative)	Companies		3	12	12	13
	Vessels		3	12	12	13
	Fishers		13	53	53	58
1994 companies	Companies	42	39	32	31	24
	Vessels	60	62	48	47	37
	Fishers	251	265	209	234	184
Total companies	Companies	42	42	44	43	34
	Vessels	60	65	60	59	47
	Fishers	251	278	262	287	253
% of new entrant companies	Companies		7%	27%	28%	29%
	Vessels		5%	20%	20%	21%
	Fishers		5%	20%	18%	27%

Data source: FIHB (1992 to 2002)

The important observation from the group of data in table 5.6 is that new entrant access rights holding companies managed to accumulate 29% of all companies by the year 2001. Also, the cumulative share of new entrant companies has not fallen. This indicates the relative success of new abalone access rights holders. The percentage of vessels, or actual distribution of access rights (21%), is however lower than the absolute 29% of companies owned by new entrants. This indicates that new entrant access right holders generally operate smaller vessels and/or own fewer vessels per company. The concentration of access rights and quota shares in the abalone fishery is covered later in section 5.7.

5.5 SKILLS: THE ABALONE FISHERY

The racial distribution of skilled individuals in the abalone fishery provides an indication of the potential for strong redistribution. Because it is more likely that skilled fishers (divers or assistant divers) will hold, or have the potential to hold, access rights to the abalone fishery by owning or leasing licensed fishing vessels, the focus of a racial skills distribution is on the skilled group only. Data on the 2000/2001 fishing season surveyed by the Economic and Sectoral Survey (Mather et al, 2002) are used.

A number of indicators on the racial distribution of skilled abalone fishers is presented in table 5.7 below. Average income by race group and the percentage of Black[7] skilled abalone fishers are based on Mather et al (2002). Bearing in mind that redistribution aims at normalising society, the percentage of skilled fishers is adjusted to the racial demography[8] of South Africa. A racial income differential provides an indicator of the experience and the level of skills within a particular group[9] (for example, diver or assistant diver). It thus also measures the potential for strong redistribution as well as the size of the skills gap that still needs to be closed. A composite index, which is the percentage of skilled fishers adjusted to be demographically representative and weighted by the racial income differential, provides a measure of the extent to which skills redistribution has occurred in the abalone fishery[10].

Table 5.7: Indicators of the racial distribution of skills in the abalone fishery (2000).

	Skilled	
	Black[i]	White[ii]
a. [1]Average Income	R16 364	R24 857
b. [2]Black individuals in skills group (%)	61.1%	38.9%
c. Demographic representation (b * 1.25)	76.4%	
d. Racial income differential (%)	65.8%	
e. Composite indicator (c weighted by d)	50.3%	

[1&2]: Data source: Mather et al (2002)
[i]: Historically repressed individuals of African, Asian and mixed origin. [ii]: Individuals of European origin.

The demographically adjusted racial distribution of skilled fishers, 76.4%, in the abalone fishery indicates a relatively high level of absorption of Black individuals into the abalone fishery. However the income differential is high; skilled Black people still earn an equivalent of 65.8% of the amount that skilled White abalone fishers earn. The composite indicator, therefore, provides a better picture of both the restructuring of racial skills in the fishery and the potential for strong redistribution. A composite indicator of 50.3% indicates that approximately one half of all access rights to the fishery can currently be redistributed to historically repressed individuals.

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[7] No distinction is made in terms of origin (African, Asian or mixed origin) or gender in the survey. It is, however, safe to state that this group is most likely dominated by mixed origin males.
[8] 80% of the population is black.
[9] This assumes that there is no racial prejudice in the fishery to skew the income differential.
[10] This assumes that there were no skilled fishers in the abalone fishery during the apartheid government.

This, however, requires access to capital and quota shares. The capital requirements are not exceptionally high, and the Economic and Sectoral Survey (Mather et al, 2002) estimated that the market value of vessels in this fishery is in the region of R200 000[11]. The patterns of quota share redistribution in the fishery are discussed in the next section.

5.6 QUOTA SHARES: THE ABALONE FISHERY

The awarding of short-term UNATTACHED$_{TAC}$ partially tradable quota shares in all the TAC fisheries is the major instrument used by the Quota Board, the Interim Quota Board and MCM under the Marine Living Resources Act of 1998 to achieve their redistribution agendas. This section provides some detail, within the available data, on the distribution patterns of quota shares in the abalone fishery. Figure 5.3 below provides a picture of redistribution patterns under the various quota share distribution institutions.

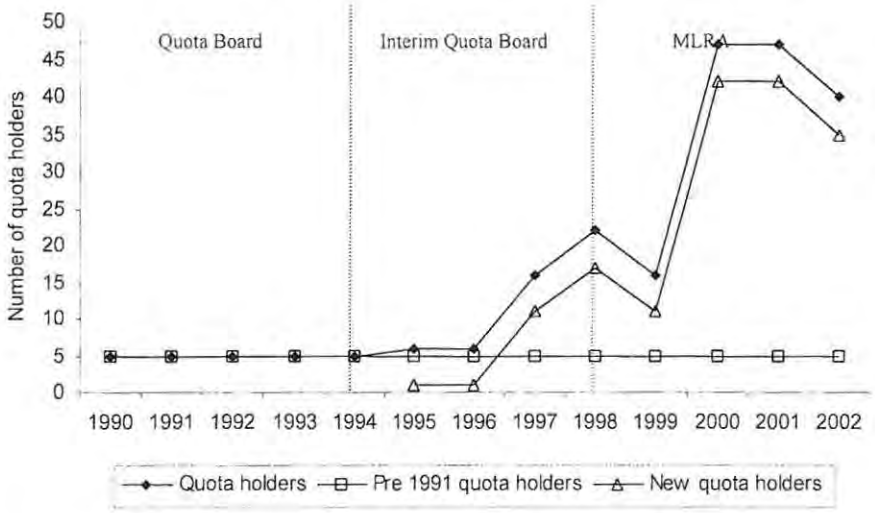

Figure 5.3: The distribution of abalone quota shares between pre-1991 quota holders and new quota holders (1990 to 2002).
Data source: FIHB (1990 to 2002)

No new quota holders were added during the Quota Board time. However, some redistribution, or broadening of the quota holding base, occurred under the Interim

[11] This data is unreliable.

Quota Board. Figure 5.3 provides evidence that a relatively large number of new quota holders were introduced under the Marine Living Resources Act of 1998. The drop in quota holders displayed in figure 5.3 during 2002 is as a result of introducing 173 additional limited commercial quota holders—these are not illustrated in the figure. Although redistribution has definitely occurred in this fishery, it is important to gauge the success of the various distribution institutions as well as the entry and exit of quota holders into or out of the fishery. This is demonstrated in table 5.8 below.

Table 5.8: The distribution, entry and exit of abalone quota holders (1990 to 2002).

	Fishing Season												
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
		Quota Board				Interim Quota Board				MLRA			
Quota holders	5	5	5	5	5	6	6	16	22	16	47	47	39
Pre 1991 quota holders	5	5	5	5	5	5	5	5	5	5	5	5	5
New quota holders (s)								5	4	4	27	33	34
New quota holders (u)						1	1	6	13	7	15	9	
Entry													
New quota holders (s)								5	-1[a]		23	6	2
New quota holders (u)						1		5	7		8		
Exit													
Pre 1991 quota holders													
New quota holders (u)										-6		-6	-9

Data source; FIHB (1990 to 2002)
(s): Successful quota holders, (u): unsuccessful quota holders, [a]: This indicates that a quota holder lost a quota share in 1998 but was re-awarded it later.

Assuming initially that only companies who were awarded a medium-term (four year) quota share during 2002, but did not have quota shares during 1990, are within the set called 'successful redistribution', table 5.8 illustrates the success of redistribution strategies. First, all pre-1991 quota holders were successful. Second, no successful redistribution or broadening of the distribution occurred in the abalone fishery during the Quota Board time. Third, in the interim Quota Board period—between the formation of the Fishing Policy Development Committee and the enactment of the Marine Living Resources Act in 1998—only four companies were added to the set of finally successful companies. Finally, with an initial hitch (see chapter 3) both the redistribution and broadening of the distribution of quota shares under the Marine Living Resources Act proved to be the most successful. Throughout the Interim Quota Board time 17 organisations were added but only four were successful—a 24% success rate compared to a 73% success rate under the Marine Living Resources Act.

Within the structure of South African individual quota share distributions, which are tradable, asset sizes are theoretically not important[12], but they still provide indicators of i) the ability of 'new quota holders' to enter the fishery and ii) the concentration of power in the fishery. If the asset size is too small, 'new quota holders', will not have strong incentives to enter the fishery by purchasing or leasing a licensed vessel[13]. Similarly, if quota shareholding is concentrated with a few companies, these companies have power in the sense that they control the distribution of resource rents. Table 5.9 provides a summary of asset size distribution in the abalone fishery.

Table 5.9: Asset sizes of abalone quota shares 1990 to 2002.

	Asset sizes (tons)												
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
	Quota Board				Interim Quota Board					MLRA			
Average	128.0	125.0	119.0	120.0	121.0	102.5	102.5	38.4	25.0	33.1	10.6	7.9	9.7
Highest	204.5	199.7	190.1	191.7	193.3	193.3	193.3	174.0	140.9	149.9	87.3	64.8	55.0
Lowest	38.1	37.2	35.4	35.7	36.0	36.0	36.0	2.0	2.6	1.7	2.0	1.5	2.3
Diff High to low	166.4	162.5	154.7	156.0	157.3	157.3	157.3	172.0	138.3	148.1	85.3	63.3	54.6
Quota holders	5	5	5	5	5	6	6	16	22	16	47	47	39
TAC	640	625	595	600	605	615	615	615	550	530	500	371	388

Data source: FIHB (1990 to 2002)

With respect to table 5.9, the small changes in asset size prior to 1994 were a result of fluctuations in the TAC. The first broadening of the distribution of quota shares during the interim Quota Board time between 1995 and 1996 was based on the Quota Board's strategy of redistributing any positive addition to the TAC. The TAC increased by 10 tons between 1994 and 1996. An amount of 10 tons was awarded to the Hermanus Community Trust, who subsequently lost their quota share during the 2002 distribution round, which did not affect asset sizes. However, after 1996 the number of 'new quota holders' grew far more rapidly than the changes in TAC, in fact the TAC dropped consistently between 1996 and 2002, indicating a new redistribution strategy.

[12] If quota shares are tradable then theoretically they can be conglomerated into viable asset sizes through trade (see chapter 4). Tradable quota shares are simply portions of the resource rent that are allocated according to some policy or strategy.

[13] This is particularly true if the quota shares are awarded for a one year term, as was the case in South Africa until 2002 when four year term quota shares were awarded.

The asset sizes of abalone quota holding companies that existed prior to 1994 fell in accordance with, first the amount redistributed to 'new quota holding companies' and second, a proportional drop in TAC. New quota shareholding companies that existed for more than a year also experienced asset size decreases in proportion to the falling TAC. The major redistribution change, coupled with falls in asset sizes, occurred under the Marine Living Resource Act in 1998. No redistribution of quota shares occurred during 2000—a roll-over year (see chapter 2). During 2002, the number of commercial abalone quota holders decreased, but 173 limited commercial quota shares all with asset sizes of 143 kilograms were added. The pattern of changing asset size with distribution strategies is illustrated below in figure 5.4.

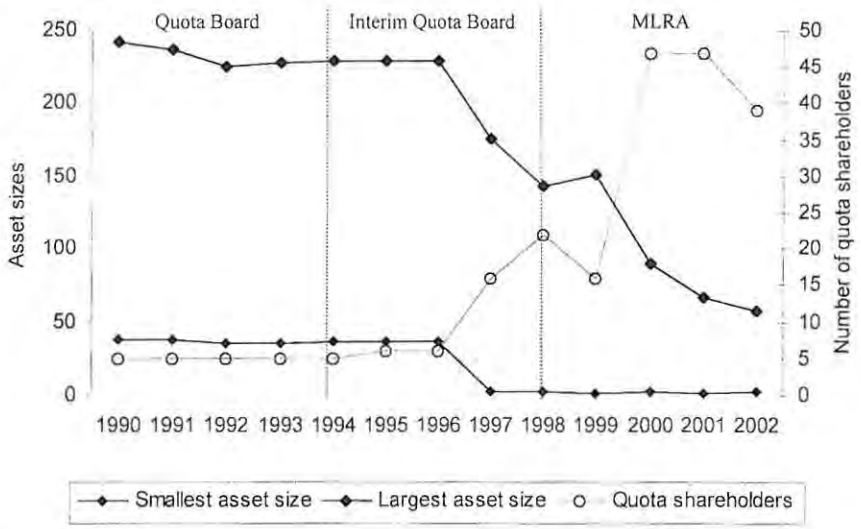

Figure 5.4: Pattern of changing asset size with the distribution strategy of abalone quota shares from 1990 to 2002.
Data source: FIHB (1990 to 2002)

An aspect of the redistribution strategy that is perhaps the most worrying is a consistent drop in the minimum asset size from a high of 38.1 tons per year to a final 2.3 tons in 2002 (table 5.9). If the harvesting capacity, estimated at 6.7 tons per year for the smallest size vessels operating in the abalone fishery (table 5.4), is acceptable, then about 80% of quota holders are awarded below minimum asset sizes (see table 5.5). The average asset size in 2002 was 9.7 tons per commercial quota share, indicating that the fishery is not over-subscribed.

Although many new successful quota holders were added during the Marine Living Resource Act, the distribution of the TAC between new quota holders and pre-1991 quota holders, and the discrepancy in asset sizes between old and new, is an important aspect of successful redistribution, at least of the resource rents. Table 5.10 below provides some evidence of these distributional patterns that occurred during the three institutional periods.

Table 5.10: Percentage of the TAC and average asset sizes in the distribution of abalone quota shares between new and pre-1991 quota holders (1990 to 2002).

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
		Quota Board				Interim Quota Board				MLRA			
TAC (tons)	640	625	595	600	605	615	615	615	550	530	500	371	388
Pre-1991 quota holders	5	5	5	5	5	5	5	5	5	5	5	5	5
% TAC						98%	98%	91%	82%	91%	49%	49%	40%
Average asset size (t)	128	125	119	120	121	121	121	112	91	96	49	36	31
New quota holders						1	1	11	17	11	42	42	34
% TAC						2%	2%	9%	18%	9%	51%	51%	51%
Average asset size (t)						10	10	5.0	5.7	4.3	6.1	4.5	6.7
Limited commercial													173
% TAC													19%
Average asset size (t)													0.43

Data source: FIHB (1990 to 2002)
(t): tons

Some fluctuations in the asset size are due to changes in the TAC arising from environmental factors and the harvest in the previous period. However, the quota share distributing authority determines the percentage of the TAC. First, the percentage of the TAC awarded as quota shares to the five pre-1991 quota holders decreased from the entire TAC to 40% of the TAC. The average asset size awarded to these companies fell from about 120 tons each to just over 31 tons. Second, new quota holders were awarded a steadily larger proportion of the TAC. Eventually in 2002, 51% of the TAC was awarded to new commercial quota holders and 19% as limited quota holders. The average asset sizes of the new quota holders are, however, substantially smaller. For example, after the 2002 distribution of quota shares, the average asset size awarded to new quota holders was 22% of the size of the pre-1991 quota holders' average asset size. The limited commercial asset size is 2% of the pre-1991 companies.

Table 5.10 also serves to illustrate that some degree of quota holding concentration exists in the abalone fishery. For example, during 2002 the five pre-1991 quota

holders controlled 40% of the TAC, the 34 new quota holders controlled 51% and the 173 limited quota holders 19% of the TAC. The concentration of quota shares and access rights is dealt with in the next section.

5.7 CONTROL: ABALONE FISHERY

5.7.1 Access rights (fishing capital)

Although a complete list between the years 1993 and 2001 of vessels, fishers and vessel owners (or lessees) is provided in appendix A4, table 5.11 below provides a list of the top 15 access rights holders during 2001. Access rights holders (vessel owners) are ranked by the number of fishers, but presented below by the number of abalone licensed vessels, or actual access rights, that each company or individual controls.

Table 5.11: Abalone access right holders (vessel owners) in the top 15 companies during 2001.

	1993	1994	1995	1996	1997	1998	1999	2000	2001
% of vessels	55%	57%	57%	59%	52%	63%	53%	58%	60%
Gillion	11	11	11	10	9	9	10	9	9
Figaji PAD	2	2	2	3	3	3	3	3	3
Henn JW	2	2	2	2	2	2	2	2	2
Prince WB	2	2	2	2	2	2	2	2	2
Swart CW	2	2	2	2	2	2	2	2	2
Otto JGJ	2	1	1		1	1	1	1	1
Stewart BA	2	2	2			1	1	1	1
Le Roux JE	1	1	2	2	1	1	1	1	1
Bailie JF	1		2	1				1	1
Dynaard LCN	1	1						1	1
Kleinsmidt AS	1	1							1
Fisher CA			2					1	1
Henn FJ					1	1	1	1	1
Hess AJ			2	2	2		2	1	1
JM&MAG Fishing								1	1

Data source: FIHB (1992 to 2002)

The important observation from table 5.11 is the relative consistency of the top five access rights holders throughout the period 1993 to 2001 and the apparent[14] absence of consolidated company subsidiaries or associates. This in itself indicates that the access rights, or vessel ownership, belong to the fishers. It is, however, not the entire story because quota shares are not attached to access rights or vessels ownership. The

[14] This is an apparent observation because the ownership of these small companies is very difficult to determine with certainty and because of the relatively low capital requirements (around R200 000), they are subject to rapid transfer.

concentration of quota share holdings as a percentage of the TAC, as opposed to access rights or vessel ownership, is discussed below.

5.7.2 Quota shares (Resource Rent)

Table 5.12 below shows the percentage of the TAC that the top 10 quota holders for 2002 were awarded, and the change in their respective proportions under the different quota share distribution institutions. The parent companies of the fishing corporations are listed in brackets[15]. The percentage of the TAC distribution between pre-1991 companies and large new quota holders, as well as between large quota holders and small commercial new quota holders, is also presented.

Table 5.12: Quota shares as percentages of the abalone TAC of large quota holders and small quota holders (1990 to 2002)

	Fishing Season												
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Pre-1991 quota holders		Quota Board				Interim Quota Board				MLRA			
Sea Plant Products (Foodcorp)	32	32	32	32	32	31	31	28	26	28	15	15	12
Tuna Marine (Oceana)	28	28	28	28	28	28	28	28	25	28	15	15	12
Walker Bay Canners (I&J)	24	24	24	24	24	23	23	21	19	21	11	11	9
Blue Star Holdings	10	10	10	10	10	10	10	9	8	9	5	5	4
Abalone Processors	6	6	6	6	6	6	6	5	5	5	3	3	2
% of the TAC	100	100	100	100	100	98	98	91	82	91	49	49	40
Large new quota holders													
Overberg Comm Abalone Divers Assoc								1			17	17	14
SA Comm Fishermans Corp											4	4	3
Suderlike Bootassintente											3	3	2
Hawston Vissers Co								2	2	2	2	2	2
Cape Fish Processors											2	2	1
% of the TAC								2	2	2	27	27	22
Large quota holders													
Number	5	5	5	5	5	5	5	7	6	6	10	10	10
% of the TAC	100	100	100	100	100	98	98	93	85	93	76	76	62
Small quota holders													
Number						1	1	9	16	10	37	37	30[1]
% of the TAC						2	2	7	15	7	24	24	19

Data source: FIHB (1990 to 2002)

[1]: The 173 limited commercial quota holders are not included (these quota holders control 19% of the TAC).

The five established pre-1991 quota holders are all processing companies that still do control a significant portion of the TAC. Although the degree of concentration has been eroded, particularly under the quota share distribution institutions of the Marine

[15] See appendix A3 for a derived structure of the fishing corporations.

Living Resources Act, three big fishing corporations still control one third of the TAC, namely, Foodcorp 12%, Oceana 12% and Irvin & Johnson 9%. The two big new quota holders, Overberg Commercial Abalone Divers Association and the South African Fishermens Corporation, are comprised of groups of fishers (who are probably also the vessel owners) who contract their members to harvest their quota share (see section 5.3). The fact, however, remains that the major portion of the TAC is controlled by a small percentage of the quota holders, most being processing companies. Most vessel owners, or access right holders, do not hold a sufficiently large quota share to make their operations economically viable and have to contract with the larger quota holders to harvest for them. However, the redistribution strategies employed under the Marine Living Resources Act of 1998 served to reduce this monopsonistic market structure significantly.

Recently in August 2003 a new draft policy for the distribution of quota shares was made available for comment (RSA, 2003). The general idea behind the document is that the recreational fishery will be closed (that is, recreational fishers will not be allowed to take abalone for their own consumption), commercially viable quota shares will be awarded to as many divers/fishers as is possible and particularly to historically disadvantaged (Black) people for a 10 year duration (the divers must have access to a suitable vessel with a maximum length of 8m) and the harvesting zones will be further sub-divided. The Abalone Rights Holders Association (ARHS, 2003) provided a well-argued and carefully considered response. They maintained that the draft policy was not based on a consultative process, that it would result in massive job losses in the processing factories (and the associated economic losses) and the fact that a fishery can be more effectively managed with fewer players meant that MCM was confusing the quota share distribution issues with policing illegal abalone harvesters. This new debate will not be discussed in the thesis.

5.8 STRONG VS WEAK REDISTRIBUTION: ABALONE FISHERY

The economic utilisation of a fishery requires fishing capital, fishing skills and an exclusive use of the resource assets. In the South African situation, the structure of individual fishing rights separates fishing activities (the skills base, fishing capital and access rights) from the exclusive use of the resource (quota shares). The South

African redistribution strategy under the institutional framework of the Marine Living Resources Act of 1998 is accordingly aimed exclusively at broadening the distribution of quota shares, or the resource rent—a weak redistribution strategy. The intended outcome must, however, be a strong redistribution where both fishing capital and fishing skills (including business skills) are also transferred to historically repressed (black) individuals. The aim of this section is to determine the extent to which the redistribution of quota shares (resource rent) seems[16] to have had an effect on the distribution of both fishing capital and fishing skills, that is, has a weak redistribution strategy the potential to have strong redistribution consequences?

Primarily, the number of quota shares allocated determines the potential number of access rights because if an individual is awarded a quota share, withholding the right to fish (an access right through the purchase or lease of a licensed fishing vessel) "...is probably unconstitutional" (Plasket, 2002:16). The number of quota shares—if not divisible—thus places an upper bound on the number of fishing vessels exploiting the stock. Assuming that industrial decentralisation is a goal of redistribution, at the extreme it should be possible to award a quota share to each vessel. The broadening of the distribution of quota shares is plotted against the number of vessels (access rights) and the number of quota holding companies between 1993 and 2001—under the three distributional eras—in figure 5.5 below. The 173 limited quota shares are not included in the figure, nor are the recreational licences or the illegal fishery.

[16] Because the racial composition of 'new entrants' into the fishery (new ownership of licensed vessels—access rights) and 'new quota shareholders' is unknown, the findings are uncertain. In fact MCM itself is uncertain of the racial distribution; Kleinschmidt (2003:19) the deputy director general of MCM is relying on a survey in 2004 to determine this.

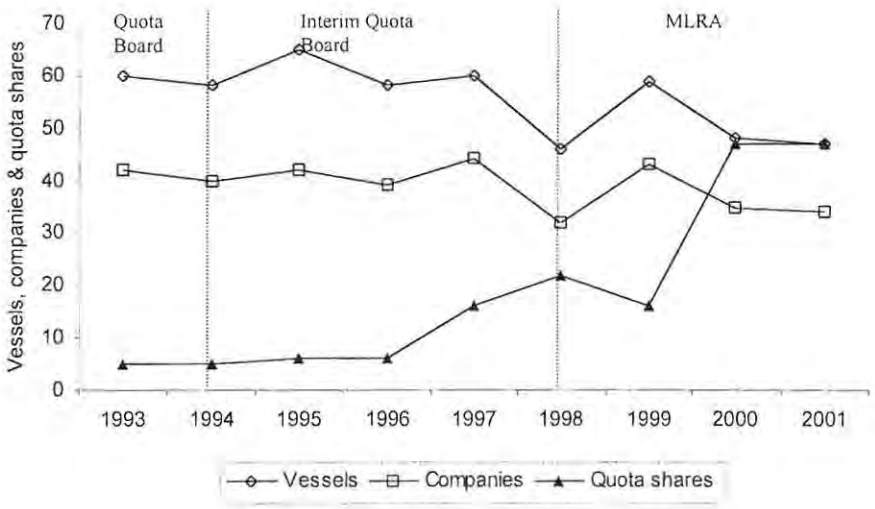

Figure 5.5: Vessels licensed to harvest abalone (access rights), quota shareholding companies and the number of quota shares between 1993 and 2001.
Data source: FIHB (1992 10 2002)

Figure 5.5 shows that the number of vessels and companies has fallen since 1993, which is in line with the trend of a falling TAC—vessels exit the fishery when the TAC falls. Also the number of quota shares increased steadily until the absolute amount, more or less, equalled the number of commercial vessels in 2000. The concentration of vessel ownership has not, however, changed significantly—the distance between the vessel line and the companies line on figure 5.5 has not substantially narrowed. The creation of 173 limited commercial quota shares during 2002 is, however, worrying. Quota shares in the commercial abalone fishing fleet were already balanced against the number of quota shares during 2000 and 2001. The introduction of the 173 limited commercial quota shares brings with it the potential for another 173 abalone fishing vessels to enter the fishery. Bearing in mind that micro-vessels are used in the commercial fishery, it is unlikely that the limited quota shares will encourage technologically superior smaller vessels.

Although the number of access rights (licensed vessels) is balanced with the number of quota shareholders, the asset sizes of the quota shares are important—this point is discussed earlier. If a sub-economic asset size is awarded to a 'new quota holder' the incentive for this individual to invest in a vessel is weakened, particularly if the quota shares are of a short one-year term. This results in weak redistribution, as the quota holder will have the incentive to sell rather than use their quota share, thus also

increasing transaction costs to the fishers or fishing companies. As is illustrated previously, 80% of new quota shareholders were awarded asset sizes below the standard harvest performance[17] of the smallest class of vessel operating in the fishery. The two 'new quota holders' who were awarded quota shares above the standard harvest performance are divers' associations who divide their quota share between their members. The average asset size in the fishery during 2002 at 9.7 tons is still, however, larger than the average harvest performance of the smallest abalone vessels.

The way the industry deals with lower-than-average performance asset sizes is discussed in section 5.2. To recap, the processing companies allow vessel owners with access rights to harvest a portion of their quota share if they sell their catch to them. In other words, although the concentration of quota shares held by the top five processing companies has decreased from 100% in the early 1990s to 40% in 2002, the distribution of quota shares still allows some degree of monopsonistic power to the processing companies. However, it also enables access rights holders, who also have quota shares, to be independent, particularly if a number of them pool their quota shares. Fundamentally therefore, the evidence suggests that the abalone fishery does not currently have a harvesting over-capacity problem. This, however, might not remain the case; particularly with longer-term rights it might pay some 'new quota holders' to buy or lease licensed fishing vessels and thus add to the harvesting capacity of the fleet and the potential for over-fishing to result.

From a redistribution point of view, by 2002, 60% of the total quota had been redistributed from the dominant five processing companies to 34 successful 'new quota holders', albeit largely in below-average harvest performance asset sizes. The racial distribution of skilled fishers during 2000, when adjusted for racial income differences and racial demography, indicates that only 50% of historically repressed individuals are at a skills level equivalent to their white counterparts. Further, only 21% of vessels with licences to harvest abalone have changed hands since 1994. Although this indicates a very stable fishery, the evidence for strong redistribution is

[17] The average harvest performance of the vessels takes into consideration that virtually the entire abalone fleet also holds commercial line-fishing licences—an effort-controlled fishery. Also, the average performance is not necessarily a minimum viable asset size; the price of abalone is high relative to the capital expenditure on an abalone vessel and it is likely that a fair return to capital can be realised on a relatively small asset size.

discouraging. While 60% of the resource rent has been redistributed, only 21%[18] of the fishing capital has changed hands even though the potential, based on skills levels, exists for a successful 50% transfer of fishing capital. This, however, might be a result of the expected reluctance of 'new quota holders' to invest in fishing vessels—the one-year term coupled with a 43%[19] chance of not having the quota share renewed makes the prospect of leasing, or selling, a newly gained quota share far more attractive and less risky than investing in capital equipment.

5.9 SYSTEM EFFICIENCY: THE ABALONE FISHERY

In fact the general scenario experienced in the abalone fishery leads to an increasingly inefficient fisheries management plan. With the number of new quota holders the informational requirements to manage the fishery must have increased substantially. To remain efficient, all trades in quota shares must be recorded. Also, the catch from each vessel must be recorded (including what quota shares were harvested from what vessels) as well as the amount of abalone processed and sold. To retain system efficiency, all this information must be coordinated and analysed to set the following year's TAC, to determine the capacity increases or decreases in the fleet, to measure the real effects of the distribution policy (strong redistribution) and to enable enforcement to function efficiently. The enforcement costs, due to the large increase in information, must also rise considerably, which with the recreational fishing and an increase in abalone poaching makes this system even more difficult to control.

From the private fishing company point of view, more quota holders with smaller and smaller asset sizes and a falling TAC mean increased transaction costs in the private sector and increased incentives to cheat. The addition of 173 limited commercial quota holders with very small asset sizes makes the abalone fisheries management plan that much more difficult to contain and the informational and associated costs very much larger. The inherent flexibility defined in the structure of individual fishing rights will eventually, when long-term individual fishing rights are awarded

[18] The racial distribution of this 21% is not determined.
[19] During the redistribution of quota shares from 1995, 26 companies received and lost quota shares and a final 34 new companies in 2002 were awarded quota shares, that is, a 43% chance of not having a quota share renewed.

and made transferable, result in a re-concentration of the TAC into a few hands, probably reversing most of the redistribution attempts made by MCM.

5.10 OVERVIEW: WEST COAST ROCK LOBSTER (WCRL) FISHERY

West coast rock lobster (*Jasus lalandii*) are distributed generally close to shore from about 23^0 S, just north of Walvis Bay in Namibia, to about 28^0S, near East London in South Africa. Commercial densities are, however, only encountered along the west coast from about 25^0S in Namibia to slightly east of the Cape of Good Hope in South Africa (Pollock 1986). The South African west coast rock lobster fishing grounds are divided into four traditional fishing zones (Zones A to D) each consisting of two fishing areas (illustrated on map A5.1 in appendix A5). Three geographically separated small fishing areas (Areas 10, 11 and 12) have been combined into a fifth zone (Zone E). (Clark, 2001).

Table 5.13: West coast rock lobster fishing zones and their fishing seasons.

Zone/Area	Season
Zone A The area drawn between the mouth of the Orange River and the mouth of the Brak River	1 October – 30 April
Zone B The area drawn between the Brak River and the water tower at Dwarskersbos.	15 November – 30 June
Zone C The area from the water tower at Dwarskersbos to the beacon marked YF, situated at Yszerfontein.	15 November – 30 June
Area 7 The area drawn between from a beacon marked YF and the northern beacon MB1 of the rock lobster sanctuary at Melkbos Point.	15 November – 30 June
Area 8 The area from the beacon HD1 of the Cape Peninsula rock lobster sanctuary to the lighthouse at Cape Hangklip. Area 8 (Deep Water) This is a sub-area of Area 8. Fishing is only permitted in the area south of a straight line joining the co-ordinates 34°18.6'S, 18°20.0'E and 34°23.2S, 18°27.0'E and a straight line between 34°23.2S, 18°27.0'E and 34°25.0S, 18°49.8'E.	15 November – 30 June 15 November – 30 June
Area 10 The area from the beacon at Oudeschip to the beacon marked H1 at "Die Josie", situated near Chapman's Peak.	1 March – 31 March
Zone E The area from the lighthouse at Cape Point to the lighthouse at Cape Hangklip. This excludes the area within 1 nautical mile from the high water mark bounded by a northern boundary drawn from the mouth of the Buffels River and a southern boundary drawn from the lighthouse at Cape Hangklip.	15 November – 30 June

Source: Adapted from Clark (2001:17)

The relative importance in terms of commercial harvest in each zone and area is illustrated in table 5.14 below. In the early 1990s about 95% of the west coast rock lobster catch was harvested in Zones B, C and D; however by the 1999/2000 fishing season Areas 7 and 8 in Zone D dominated the total catch (from 48% to 85% of total commercial catch). The decrease in the productivity in Zones B and C is postulated as a result of decreased somatic growth rates and the cumulative effect of increased lobster stranding events in these zones (Cockcroft et al, 2000).

Table 5.14. Commercial west coast rock lobster harvest by zone as a percentage of total landings in 1992/93 and 1999/2000 fishing seasons.

	TAC	Zone A		Zone B		Zone C		Zone D		Zone E		
		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11
92/93	2 200	37	9	212	329	168	320	378	654	39	30	
93/94	2 200	37	2	5	550	88	283	342	828	32	32	
94/95	2 000	27	0,3	69	433	24	106	316	932	28	27	
95/96	1 520	30		13	360	14	40	267	745	30	18	
96/97	1 675	29		17	369	15	23	318	857	29	22	
97/98	1 920	26	0,1	0,4	152	17	32	663	965	37	23	
98/99	1 781	4	5	21	88	3	12	578	1015	36	31	
99/00	1 720	6	0,2	63	85	7	7	568	891	33	31	25
00/01	1 614	13		55	40	7	3	579	376	28	1	20

Source: Adapted from Clark (2001:7)

Fishing in the area east of Cape Hangklip (Area 12 of Zone E) is part of an experiment designed to examine the resource and management implications of a small-scale commercial fishery.

Two harvesting method are currently employed, namely, hoopnets and traps (Clark, 2001:10-12). Hoopnets are used mostly by micro to small vessels in shallow waters not exceeding 30m in depth. Hoopnet dinghies can operate independently from the shore (harbour) or they are transported to the fishing grounds by a motorized mother vessel (deckboat). The need for greater efficiency in deeper waters led to the introduction of traps in the 1960s. A trap consists of a metal frame covered by polyethylene netting, with a top or a side entrance. The larger size and weight of traps means that they can only be used with relatively large vessels with inboard motors and the vessel fitted with power winches. (Clark, 2001:11).

Clark (2001:26) points out that during the 1999/2000 fishing season a minimum of 80% of all west coast rock lobster harvested were captured by trap technology. Apart from in Zone B, the use of deck boats has been phased out. Table 5.15 shows the percentage usage of dinghies, deck boats and traps in the harvesting zones and important areas.

Table 5.15: Percentages of harvesting methods used in the various west coast rock lobster commercial fishing zones.

	Zone A			Zone B			Zone C			Zone D						Zone E								
										Area 7			Area 8			Area 10			Area 11			Area 12		
	T	DB	D	T	DB	D	T	DB	D	T	DB	D	T	DB	D	T	DB	D	T	DB	D	T	DB	D
Av 80s				50	32	18	72	16	12	98	2	0	80			100	0	0	-	-	-	-	-	-
90/91				74	14	12	81	7	12	95	2	3				100	0	0	-	-	-	-	-	-
91/92				75	11	14	65	1	35	77	20	3	84		16	100	0	0	-	-	-	-	-	-
92/93				60	21	19	75	12	13	99	0	<1	88		12	100	0	0	100	0	0	-	-	-
93/94				45	26	29	75	12	13	100	0	0	87		13	100	0	0	100	0	0	-	-	-
94/95		33	67	53	22	25	78	17	5	91	9	0	83	<1	17	100	0	0	100	0	0	-	-	-
95/96		33	67	59	21	20	89	0	11	99	<1	<1	86	<1	14	83	17	0	100	0	0	-	-	-
96/97		31	69	50	19	31	73	0	27	99	1	0	88		12	100	0	0	100	0	0	-	-	-
97/98		19	81	19	32	49	80	0	20	100	0	0	91		9	100	0	<1	100	0	0	-	-	-
98/99		56	44	28	37	35	80	0	20	94	6	0	89		11	86	11	3	100	0	0	-	-	-
99/00		<1	>99	34	14	52	43	0	57	97	2	<1	90		10	96	0	4	100	0	0	0	0	100

Source: Adapted from Clark (2001:26)
T: trap, DB: deck boat, D: dinghy

Table 5.15 shows that in the northern fishing zones (A, B and C) hoopnets, deployed from dinghies, have steadily replaced the use of deck boats and traps. However, table 5.15 also illustrates that the harvest levels have also substantially decreased in these zones. Bearing in mind that west coast rock lobster are slow growing and long lived species, Pollock & Shannon (1997) attribute the productivity changes to the anomalous *El Niño* years of 1990-1993. In other words, an exogenous environmental change may have given rise to a technological substitution away from the use of larger deck boats, and has as a result encouraged and enabled small-scale fishing enterprises. In contrast, the relative catch in the southern zones has increased to 85% of the total harvest (table 5.14) using predominantly traps (over 90%) as a method of capture.

Similar to the abalone fishery, the west coast rock lobster fishery also has a recreational and subsistence fishery. The distribution of west coast rock lobster TAC

between the commercial, recreational and subsistence was during the 2000/2001 fishing season split 80:8.6:11.4 respectively (Clark 2001:3).

The recreational fishery is restricted by daily bag limits, 80 mm carapace length minimum size, gear (only hoopnets or diving without compressed air are allowed) and closed seasons. In addition, weekday fishing is limited during certain periods and the recreational fishers are not allowed to sell their catch.

Table 5.16: Summary of recreational west coast rock lobster catches from the 1991/92 to the 1998/99 fishing season.

	Fishing season							
	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99
Number of permits sold	44 469	59 202	57 590	54 160	57 778	65 617	44 383	39 982
Average number of rock lobster caught per permit	9	23	20	18	19*	22	22	19
Commercial TAC (%)	6.6%	21.3%	17.7%	16.8%	25%*	29.5%	19.5%	14%

Source: Clark (2001:15)

During the 1996/97 fishing season, a peak amount of 65 617 recreational fishing permits were sold with a result that recreational fishers caught almost one third the amount allocated to commercial fishers. The situation has, however, been rectified by reducing the number of permits sold to recreational fishers.

Subsistence fishing was introduced in the 1999/2000 fishing season. The subsistence fishers are limited to using hoopnets cast from the shore or small fishing boats. The daily bag limit of four rock lobsters per subsistence permit may be sold to individuals, restaurants, fish shops and processing factories.

5.11 THE STRUCTURE OF THE FISHING FLEET: WCRL FISHERY

Similar to the discussion on the abalone fishery, the purpose of this sub-section is to provide a sense of the structure of the west coast rock lobster fishing fleet, and how it has changed over the past decade. The fleet is similar to the abalone fleet essentially

being a multi-species one, that is, the vessels harvesting west coast rock lobster usually carry licences to harvest other species as well. As is illustrated in table 5.17 most of the licences held to harvest other species are effort licences. Effort shares (hand-line 'Hl', tuna 'Tu', squid 'Sq', and shark long-line 'Shl') are, however, distributed to individuals, but attached to vessels, in a similar manner to the quota share distribution.

Table 5.17: Percentage makeup of the multi-species fleet harvesting west coast rock lobster.

	Fishing season									
	92	93	94	95	96	97	98	99	2000	2001
K	6%	6%	7%	5%	6%	11%	14%	16%	24%	23%
Hl,K	36%	49%	56%	63%	56%	60%	54%	61%	54%	53%
Hl,K,Tu	47%	32%	25%	23%	18%	15%	16%	15%	13%	14%
	89%	**87%**	**88%**	**90%**	**81%**	**86%**	**83%**	**91%**	**91%**	**90%**
K,Tu		4%		1%	2%	1%	2%	2%		
Hl,K,Sq			1%	1%	2%	1%	1%	1%	0.5%	0.5%
Hl,K,Tu,Shl	1%	0.4%	2%	4%	4%	3%	5%	2%	2%	2%
Hl,K,Tu,Sq	3%	3%	1%	2%	1%	1%	2%	1%	0.5%	0.5%
	4%	**3%**	**3%**	**5%**	**5%**	**4%**	**7%**	**4%**	**3%**	**3%**
K + effort	**93%**	**94%**	**92%**	**98%**	**89%**	**92%**	**92%**	**99%**	**94%**	**93%**

Data source: FIHB (1992 to 2002)
Licences K: west coast rock lobster, Hl: hand-line, Tu: tuna, Sq: squid, Shl: shark long-line.

Table 5.17 illustrates the vessels that hold west coast rock lobster fishing licences, or access rights, and that also hold various effort-based fishing licences, namely for hand-line, tuna, squid and shark long-line. The remaining vessels that harvest west coast rock lobster, not shown in table 5.17, hold pelagic access rights along with a menu of effort-based licences and are discussed in chapter 6. On average over the period shown above, 94% of the vessels hold other effort-based licences, mainly in the hand-line and tuna fisheries. The important observation from the graph is, however, that the number of dedicated west coast rock lobster vessels (illustrated by K in table 5.17) has increased from 6% in 1992 to 23% in 2001. This is consistent with the decrease in productivity in the northern fishing Zones (A, B and C) and the substitution to smaller less capital-intensive vessels.

In the following discussion the structure of the fleet does not distinguish between the licences held, but it does capture the characteristics of those vessels with access rights to harvest west coast rock lobster. Table 5.18 below provides a summary of the

important characteristics of the fleet between 1992 and 2001. The table is arranged as follows: the average length of all vessels licensed to fish (Ave length), the average age of the vessels (Ave age), the number of vessels holding west coast rock lobster access rights (vessels) and the average number of fishers per vessels (Ave fishers).

Table 5.18: The structural characteristics of the west coast rock lobster fishing fleet between 1992 and 2001.

	Fishing season									
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Ave length	13.5	11.9	11.3	10.2	10.7	10.4	10.4	10.1	10.6	10.5
Ave age	28	27	26	27	26	26	27	27	29	30
Vessels	181	255	217	184	148	182	153	209	176	170
Fishers	2083	2565	2135	1873	1318	1606	1481	1966	1761	1693
Ave fishers	11.5	10.1	9.8	10.2	8.9	8.8	9.7	9.4	10.0	10.0

Data source: FIHB (1992 to 2002)
Ave length: average length of vessels, Ave age: average age of the vessels, Ave fishers: average number of fishers per vessel.

The average length of the vessels has steadily decreased over the period 1992 to 2001; however, the fishery has remained within the small-vessel fishery category (>8m to 14m vessels). The incidence of smaller sized vessels (a decrease from 13.5m during 1992 to 10.5m in 2001) is interpreted as a result of the reduced productivity in the northern fishing zones. The TAC largely determines the entry and exit of vessels, which is in turn dependant on the environmental factors affecting the fishery as well as the previous year's harvest. The steady fall in the number of vessels and fishers employed illustrates the declining TAC between 1992 and 2001.

The tightening up of recreational west coast rock lobster fishing permits and reducing the total recreational catch after the 1996/1997 fishing season is partly responsible for both the slight increase in the number of vessels active in the fishery and the employment of fishers. In addition the change in the number of vessels on a year-to-year basis has stabilized. The increasing average age of the vessels simply illustrates that reinvestment is slow[20]. This is not surprising as it coincides with the quota share redistribution agendas of both the Interim Quota Board and those under the Marine

[20] Fishing vessels are specific capital assets and therefore earn quasi-rents, that is, because of the sunk costs incurred with the decision to enter the fishery, the fishing vessel owners earn rents simply by staying in the fishery because the vessels cannot easily be used for other purposes. For this reason, Milgrom & Roberts (1992:270) assert that quasi-rents are always at least as great as rents.

Living Resources Act of 1998. More detail on the structure of the west coast rock lobster fishing fleet is provided in table 5.19.

Table 5.19: The structure of the west coast rock lobster fishing fleet from 1992 to 2001 (median vessel sizes highlighted).

		Fishing season									
		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
3m to 5m (micro)	Ave length	4.2	4.1	4.1	4.2	4.09	4.2	4.2	4.3	4.3	4.3
	Ave age	13	16	17	18	18	19	22	19	22	23
	Vessels	3	30	32	25	23	37	32	47	34	34
	Fishers	8	82	85	69	61	104	104	147	112	114
	Ave fishers	2.7	2.7	2.7	2.8	2.7	2.8	3.3	3.1	3.3	3.4
>5m to 8m (micro)	Ave length		6.4	6.4	6.5	6.6	6.5	6.5	6.4	6.4	6.5
	Ave age		16	16	18	17	17	19	18	20	22
	Vessels		19	20	16	19	25	19	33	23	22
	Fishers		116	124	96	111	137	121	209	151	145
	Ave fishers		6.1	6.2	6.0	5.8	5.5	6.4	6.3	6.6	6.6
>8m to 12m (small)	Ave length	10.0	10.1	10.1	10.1	10.3	10.3	10.3	10.1	10.2	10.1
	Ave age	20	21	21	21	22	23	24	25	26	27
	Vessels	58	73	**64**	**61**	**48**	**47**	**43**	**51**	**50**	**48**
	Fishers	395	516	471	459	364	365	429	486	497	473
	Ave fishers	6.8	7.1	7.4	7.5	7.6	7.8	10.0	9.5	9.9	9.9
>12m to 14m (small)	Ave length	13.0	13.0	13.0	13.0	13.0	13.0	13.2	13.1	13.2	13.2
	Ave age	28	29	30	30	30	30	30	31	32	32
	Vessels	30	37	33	27	22	30	20	27	21	20
	Fishers	343	436	395	337	272	366	218	325	233	225
	Ave fishers	11.4	11.8	12.0	12.5	12.4	12.2	10.9	12.0	11.1	11.3
>14m to 18m (medium)	Ave length	16.0	16.0	15.9	16.0	16.0	16.0	15.9	15.8	15.9	15.8
	Ave age	35	29	37	38	39	39	39	39	40	41
	Vessels	**81**	**85**	60	48	33	39	36	44	42	40
	Fishers	1156	1187	878	760	453	546	517	626	605	570
	Ave fishers	14.3	14.0	14.6	15.8	13.7	14.0	14.4	14.2	14.4	14.3
>18m to 20m (medium)	Ave length	18.8	19.0	18.9	19.1	18.8	18.8	18.5	19.0	19.0	19.0
	Ave age	35	35	34	35	35	36	42	39	40	41
	Vessels	9	10	6	7	3	3	2	4	4	4
	Fishers	181	198	142	152	57	83	67	118	118	118
	Ave fishers	20.1	19.8	23.7	21.7	19.0	27.7	33.5	29.5	29.5	29.5
>20m to 25m (medium)	Ave length		33.2	26.7			21.9	22.6	21.3	21.6	21.6
	Ave age		24	31			34	8	28	24	25
	Vessels		1	2			1	1	3	2	2
	Fishers		30	40			25	25	55	45	48
	Ave fishers		30	20			25	25.0	18.3	22.5	24.0

Data source: FIHB (1992 to 2002)

The median sized vessels highlighted in table 5.19 illustrate the structural shift in the vessel length to smaller vessels. This again may be attributed to the fall in productivity in the northern zones and the use of smaller less capital-intensive fishing methods. In addition, as is illustrated in table 5.15, larger deck boats were beginning

to be phased out in favour of smaller vessels using trap technology and even smaller hoopnet vessels. This structural change impacts on the harvesting capacity of the fleet. The estimated harvesting capacity is displayed in table 5.20 below.

Table 5.20: Harvesting capacity of the west coast rock lobster fleet.

	ESS[1]	Harvesting capacity (tons)									
		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
3m to 5m	1.8	5	54	58	45	41	67	58	85	61	61
>5m to 8m	4.6		87	92	74	87	115	87	152	106	101
>8m to 12m	8	464	584	512	488	384	376	344	408	400	384
>12m to 14m	14	420	518	462	378	308	420	280	378	294	280
>14m to 18m	17.9	1450	1522	1074	859	591	698	644	788	752	716
>18m to 20m	8.3	75	83	50	58	25	25	17	33	33	33
>20m to 25m	5	0	5	10			5	5	15	10	10
Total capacity		2414	2853	2257	1902	1436	1706	1435	1858	1656	1586
TAC		2200	2139	2167	1994	1511	1695	1916	1916	1700	1588
Over/under cap		214	714	90	-92	-74	11	-481	-58	-44	-2
Vessels		181	255	217	184	148	182	153	209	176	170

Data sources: Mather et al (2000) and FIHB (1992 to 2002)
[1]: Estimates based on Mather et al (2002)

The harvesting capacity is calculated using Fishing Industry Hand Book data on the structure of vessels and the surveyed harvesting capacity by vessel's size (Mather et al, 2002[21]). The results provide evidence that the anomalous *El Niño* years of 1990-1993 (Pollock & Shannon, 1997) coupled with over-capacity in the fishery during the same time period must have contributed to the reduction in the TAC in the following years. Although the causational characteristics cannot be determined with the available data, a decline in harvesting capacity, through fewer and smaller vessels, seems to follow a fall in the TAC. This is an encouraging result simply because MCM is not as vigilant in controlling and policing the distribution of access rights (the number and harvesting capacity of fishing vessels) as it is in distributing and controlling the transfer of quota shares.

5.12 ACCESS RIGHTS: WCRL FISHERY

As is previously stated, the entry of new vessel owning, or leasing, companies into the fishery provides an indication of the potential for redistribution of access rights and fishing capital—the potential for strong redistribution. The cumulative increase in

[21] This data is unreliable.

'new entrant' companies, being the entry of companies that did not hold access rights to the fishery prior to 1994, and the decrease in companies that held access rights, and still hold access rights in 2001, is displayed in figure 5.6 below.

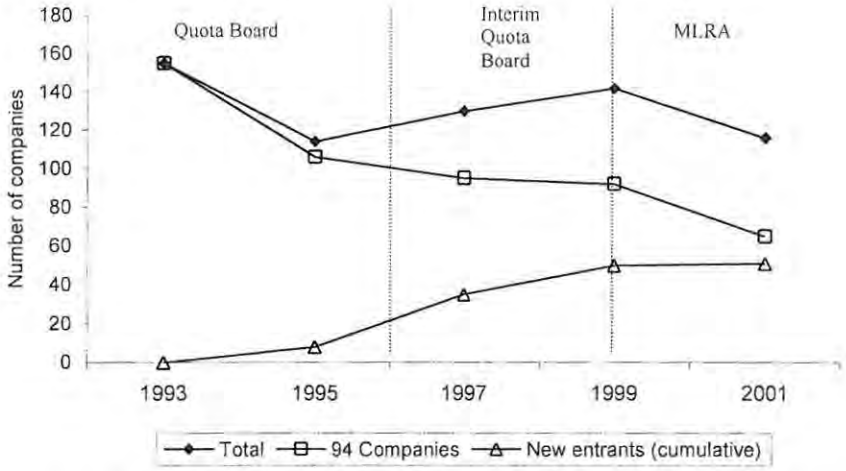

Figure 5.6: West coast rock lobster access right holding companies between 1993 and 2001.
Data source: FIHB (1992 to 2002)

Figure 5.6 shows a relatively high absorption of 'new entrant' companies into the west coast rock lobster fishery—a total of 44% of all companies in 2001 compared with 29% in the abalone fishery. The effect that the various quota share distribution regimes have had on the redistribution of access rights is also illustrated in the figure above. Few 'new entrant' companies entered the fishery during the Quota Board era although, in the Interim Quota Board time, a rapid increase in 'new entrant' companies is noted. This is interpreted as a de-concentration of access rights rather than a redistribution of access rights, that is, additional companies entered the fishery, but few existing companies exited. However, during the Marine Living Resource Act era (MLRA) the number of 1994 companies fell, accounting for the decrease in the total number of companies holding access rights. Although the rate of increase in 'new entrant' companies fell during the Marine Living Resource Act era, unlike the 1994 companies, the absolute number of all access right holding companies still increased. More detail on these trends is provided in table 5.21 below.

Table 5.21: Companies holding access rights in the west coast rock lobster fishery between 1993 and 2001.

		Fishing Season				
		1993	1995	1997	1999	2001
New entrants	Companies		8	30	11	16
	Vessels		8	34	15	18
	Fishers		63	197	191	170
New entrants (cumulative)	Companies		8	35	50	51
	Vessels		8	39	69	68
	Fishers		63	243	544	546
1994 companies	Companies	155	106	95	92	65
	Vessels	255	176	143	140	102
	Fishers	2565	1810	1363	1422	1147
Total companies	Companies	155	114	130	142	116
	Vessels	255	184	182	209	170
	Fishers	2565	1873	1606	1966	1693
Cumulative % of new entrants	Companies		7%	27%	35%	44%
	Vessels		4%	21%	33%	40%
	Fishers		3%	15%	28%	32%

Data source: FIHB (1992 to 2002)

The total number of companies holding access rights in the fishery fell in accordance with the decline in vessel numbers and employment described in the previous sub-section. The important observation from table 5.21, however, is that although the 'new entrant' companies accumulated a total of 44% of all companies by 2001, they controlled only 40% of total access rights and contributed to 32% of the total employment of fishers. This indicates that these companies are not as big as their 1994 company counterparts, each on average holding fewer and smaller vessels. The lower share of total employment of fishers provides the evidence of ownership of smaller vessels by 'new entrant' companies. The structural change in the fleet can therefore be attributed not only to the *El Niño* effect and harvest over-capacity in the early part of the 1990s, but also to the emergence of access rights holding companies that favoured, or were forced to accept smaller vessels due to capital restrictions.

5.13 SKILLS: THE WCRL FLEET

The racial distribution of skilled individuals in the west coast rock lobster fishery again provides an indication of the potential for skilled fishers to enter and hold access rights in the fishery—the potential for strong redistribution and a measurement of social equality. Survey data for the 2000/2001 fishing season (Mather et al, 2002)

are used to determine, in an identical way, similar indicators to the abalone fishery. These are presented in table 5.22 below.

Table 5.22: Indicators of the racial distribution of skills in the west coast rock lobster fishery (2000).

	Skilled fishers			
	Full time		Part time	
	Black	White	Black	White
[1]Average income	26 574	56 818	25 909	68 694
[2]% Black	65.1%		71.8%	
Adjusted % Black	81.4%		89.8%	
Income differential	46.8%		37.7%	
Composite indicator	38.1%		33.9%	

[1&2]: Data source: Mather et al (2002)

The composite indicator, which measures the percentage of Black people employed as skilled fishers adjusted by the racial demography of South Africa and weighted by the income differential, is lower among part time skilled fishers (33.9%) than full time skilled fishers at 38.1%. This is a rational result; it would pay a fishing company to invest more in human capital with full time employees than with part time ones. Also of note is that the composite indicator for full time skilled fishers is lower in the west coast rock lobster fishery than their counterparts in the abalone fishery (50.3% in the abalone fishery as opposed to 38.1% in the west coast rock lobster fishery). Bearing in mind that according to Mather et al (2002) the capital/labour ratio is slightly higher in the west coast rock lobster fishery (R0.06 million per fisher) than the abalone fishery (R0.04 million per fisher) and that a fairly large proportion of the fishers are employed as deck hands on the small to medium fishing vessels, this discrepancy is not surprising. An important observation, however, is that between a third and a quarter of the skills available in this fishery accrue to Black fishers.

5.14 QUOTA SHARES: WCRL FISHERY

The distribution of the $UNATTACHED_{TAC}$ partially tradable quota shares for the west coast rock lobster fishery under the three distributional institutions, the Quota Board, the Interim Quota Board and the Marine Living Resources Act of 1998, is discussed in this section. Figure 5.7 below shows an increase in the number of quota holders from the beginning of the Quota Board time right through to 2002.

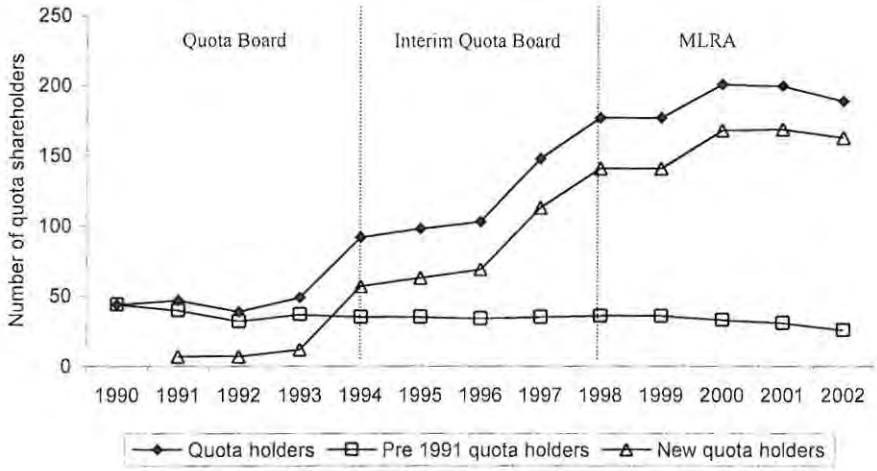

Figure 5.7: The distribution of west coast rock lobster quota shares between pre-1991 companies and new quota holders (1990 to 2002).
Data source: FIHB (1992 to 2002)

Figure 5.7 illustrates that, unlike in the abalone fishery, redistribution of west coast rock lobster quota shares began during the Quota Board era. By the end of the Quota Board time 62% of all quota holders were new quota holders (see table 5.23 below). The Interim Quota Board increased the new quota shareholding base to 80%, mainly during the 1997 and 1998 distributional rounds, which coincided with the publishing of the White Paper on the new fisheries policy. Between the enactment of the Living Marine Resources Act of 1998 and 2002, the percentage of new quota holders increased to 86%[22] to 2002. The slight decreases in new quota holders during 2001 and 2002 were as a result of the introduction of limited commercial quota holders.

More details on the distributional trends are provided in table 5.22 below; in particular the table divides the new quota holders into successful and unsuccessful categories. It then distinguishes when they entered and in the case of unsuccessful new quota holders, as well as unsuccessful pre-1991 quota holders, when they exited.

[22] This does not include the limited commercial quota shares.

Table 5.23: The distribution, entry and exit of west coast rock lobster quota holders (1990 to 2002).

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
		Quota Board				Interim Quota Board				MLRA			
Quota holders	44	47	39	49	92	98	103	148	177	177	201	200	189
Pre-1990 quota holders	44	40	32	37	35	35	34	35	36	36	33	31	26
New quota holders (s)		2	2	2	12	15	20	42	66	66	101	127	163
New quota holders (u)		5	5	10	45	48	49	71	75	75	67	42	
% of new quota holders		15%	18%	24%	62%	64%	67%	76%	80%	80%	84%	85%	86%
Entry													
New quota holders (s)		2			10	3	5	22	24		35	26	36
New quota holders (u)		5		5	35	3	1	22	4				
Exit													
Pre-1990 quota holders		-4	-8	5	-2	0	-1	1	1	0	-3	-2	-5
New quota holders											-8	-25	-42

Data source: FIHB (1990 to 2002)
(s): Successful quota holders, (u) unsuccessful quota holders

Only 12 out of 45, or 27%, of the new quota holders added during the Quota Board were eventually successful. This comprises 7% of all new quota holders in 2002. The Interim Quota Board added 84 new quota holders of which 64% were finally successful and contributed 33% to the 2002 new quota holder pool. After the Marine Living Resources Act of 1998, the decision makers added 97 new quota holders and discarded 85 quota holders, 10 of whom held quota shares prior to 1991 and the remaining 75 from those who benefited during the previous two distributional institutions.

The distribution of quota shares must, however, also be linked to their asset sizes and the distribution of the TAC between pre-1991 companies and new quota holders. The summary statistics of commercial west coast rock lobster asset size distribution between 1989 and 2002 are presented in table 5.24 below—limited commercial quota shares are not included in the calculations. As is the trend in the abalone fishery the average, median, highest and lowest asset sizes have all fallen with an increasing number of quota holders. This again illustrates the effect of dividing the TAC into more and more quota shares. However, the minimum asset size has increased (not taking into account the limited commercial quota share asset sizes) since an all-time low in 1996. This probably indicates the awareness of the fisheries authorities that a specific minimum asset size is desirable, at least in this fishery.

Table 5.24: Asset sizes of commercial west coast rock lobster quota shares in tons (1989 to 2002).

	Fishing season													
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
		Quota Board				Interim Quota Board					MLRA			
Average	93	89	81	56	44	24	20	15	11	11	11	8	8	8
Median	75	72	57	42	30	5	4	4	5	5	5	5	5	5
Highest	355	346	336	199	194	194	176	131	135	140	140	106	99	96
Lowest	14.2	5.0	1.8	1.0	0.5	0.2	0.2	0.1	0.3	0.4	0.4	0.9	0.9	1.5
Diff: High to low	341	341	334	198	194	194	176	130	134	139	139	105	99	94
Quota holders	43	44	47	39	49	92	98	103	148	177	177	201	200	189
Limited														321
Total														505

Data source: FIHB

Based on table 5.24, the narrowing difference between the highest and lowest asset sizes seems to indicate the start of a successful redistribution strategy. However, based on the harvest performance (table 5.20) of the various vessel sizes in the fishery:

a The smallest vessel size (less than 5m) harvested on average 1.8 tons of west coast rock lobster a year (this does not count the line-fish, or other species, harvested) and the largest small vessel (>12 to 14m) harvested on average 14 tons a year. Since 1991, the minimum asset size was not sufficiently large to sustain the average smallest micro-sized vessel in the fishery. The minimum asset size has, however, increased since 1997.

b The median asset size since 1994 fits into the average performance of the next size micro vessels (4.6 tons for vessels >5m to 8m).

c The average asset size, for the first time, fell below the 14 ton average harvest performance of the largest category of small vessels (<12m to 14m) during 1997.

As is previously explained, this is possibly the result of the structural change in vessel sizes due to the environment and probable over-capacity in the mid 1990s. More importantly, however, is the distribution of the TAC between pre-1991 quota holders, new quota holders and the limited commercial quota holders as well as the difference in average asset sizes of each group. The trend between the number of quota holders and the maximum and minimum asset sizes is illustrated in figure 5.8 below.

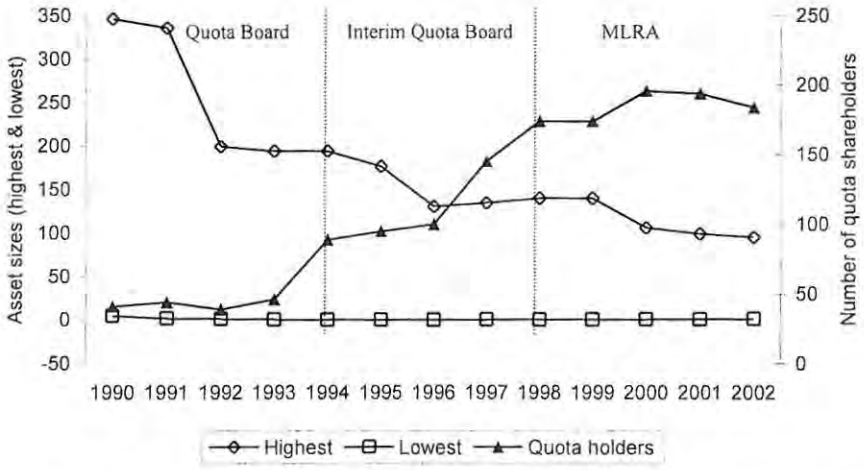

Figure 5.8: Pattern of changing west coast rock lobster asset size with the distribution strategy of quota shares (1990 to 2002).
Data source: FIHB (1990 to 2002)

Figure 5.8 highlights a distinct negative relationship between the number of quota holders and the maximum asset size. This indicates that the concentration of quota shares (as a percentage of the TAC) has steadily declined. The minimum asset size awarded dropped to below 1 ton during 1992 and only increased above the 1 ton level a decade later (1.5t in 2002)—this fact is made more clear in table 5.24 above. The large differences in the asset sizes of the quota shares awarded brings to bear the importance of measuring the distribution of the TAC between the various groups—table 5.25 below.

Table 5.25: Percentage distribution of the west coast rock lobster TAC and average asset sizes between new and pre-1991 quota holders (1990 to 2002).

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
		Quota Board				Interim Quota Board				MLRA			
TAC (tons)	3905	3790	2200	2139	2167	1994	1511	1695	1916	1916	1700	1588	1732
Pre-1991 quota holders	44	40	32	37	35	35	34	35	36	36	33	31	26
% of TAC		96%	89%	93%	86%	85%	83%	75%	66%	55%	55%	53%	44%
Average asset size	89	91	61	54	53	48	37	36	35	29	28	27	29
New quota holders		7	7	12	57	63	69	113	141	141	168	169	163
% of TAC		4%	11%	7%	14%	15%	17%	25%	34%	45%	45%	47%	43%
Average asset size		20	34	12	5	5	4	4	5	6	5	4	5
Limited commercial													321
% of TAC													13%
Average asset size													0.7

Data source: FIHB (1990 to 2002)

Based on table 5.25 above, the distribution of the TAC to new quota holders has increased from 4% in 1991 to 56% in 2002 (this number includes the limited commercial quota holders). The final distribution in 2002 provides an almost equal share of the TAC between new commercial quota holders (43% of the TAC) and pre-1991 quota holders (44% of the TAC) with the remainder going to the limited commercial quota holders (13% of the TAC).

The discrepancy comes in with the number of quota holders in each group sharing their portion of the TAC: from the 2002 medium term quota distribution round, 26 pre-1991 quota holders share a similar portion of the TAC to the 163 new quota holders (321 limited commercial quota holders share just 13% of the TAC). The 4 to 6 ton average asset size of the new quota holders coincides roughly with the micro-vessel size group's (<5m to 8m) average harvest performance (4.6tons per vessel). The limited commercial average asset size is less than one half of the average harvest performance of the smallest sized vessel (3m to 5m) operating during 2002. In contrast the average asset size of the pre-1991 quota holders has fallen from 91 tons during 1991 (or 6.5 times the average harvest performance of the >12m to 14m size group) to 29 tons during 2002 (just over twice the average harvest performance of the >12m to 14m size group).

The above results indicate a persistent bias in the asset size distribution between new quota holders and pre-1991 quota holders. The concentration in both access rights and quota shareholding is examined in the next section.

5.15 CONTROL: WCRL FISHERY

5.15.1 Access Rights (Fishing Capital)

The list of access rights holders for the years between 1992 and 2001, along with the concentration of access right holding companies is provided in appendix A5. The top 20 that held west coast rock lobster access rights during 2002 are arranged by company name (not consolidated) in terms of both vessels and fishers, summarized in table 5.26 below. Accordingly, the percentage concentration only tallies with the year 2001 in the table above.

Table 5.26: Concentration of access rights (top20 access right holders in 2002) in the west coast rock lobster fishery (1993 to 2001).

	1993		1995		1997		1999		2001	
	V[i]	L[ii]	V	L	V	L	V	L	V	L
Large pre-1991 access right holders										
Lamberts Bay Canning	17	278	17	278	6	80	11	150	8	121
SA Sea Products	17	211	8	127	9	133	8	114	6	90
Paternoster Visserye	13	127	10	98	7	72	6	63	5	58
St Helena Bay Fishing Ind	9	27	9	27	3	12	4	34	2	30
North Bay Canning	8	179	5	114	3	56	4	62	4	62
Elandsbaai Handelsmpy	5	22	6	24	6	26	6	46	5	44
Wiemar A&G	3	55	3	55	1	24	1	24	1	24
Elandia Visserye	3	12	3	12	4	16	4	44	4	44
Belalo	2	24			1	12	1	12	2	27
Plaatjies W	2	21	2	21	2	15	2	21	2	21
Burger GTJ	2	8	2	8	2	8	2	22	2	22
Namaqua Fishing	1	26	1	26	2	54	2	54	2	54
Sancho SJR	1	14	1	14	1	14			2	33
Da Mata JJ	1	12	1	12	2	24	2	32	2	32
Large pre-1991 access right holders	84	1016	68	816	49	546	53	678	47	662
% of total	33%	40%	37%	44%	27%	34%	25%	34%	28%	39%
Large new access right holders										
Young VM					2	6	7	38	7	41
Dodeka Fishing					1	25	1	25	1	25
SA Comm Fishermens Corp							6	38	7	48
Dewmist Invest							1	25	1	25
Mullin							2	22	2	22
Premier Fishing									3	23
Large new access right holders					3	31	17	148	21	184
% of total					2%	2%	8%	8%	12%	11%
Other access right holders										
Other access right holders	171	1549	116	1057	130	1029	139	1140	102	847
% of total	67%	60%	63%	56%	71%	64%	67%	58%	60%	50%

Data source: FIHB (1993 to 2001)
[i]: Vessels, [ii]: Fishers

The important observations from table 5.26 are first, the number of large new quota holding companies has increased, largely during the MLRA time and second, the top five companies, Lamberts Bay Canning, SA Seas Products, Paternoster Visserye, St Helena Bay Fishing and North Bay Canning have consistently held a significant portion of the access rights to the fishery. Most of these companies are subsidiaries and affiliates of the Oceana Group. It makes sense to reorganize the various fishing companies that hold access rights (own vessels) into their consolidated form. As is previously stated, the derived consolidated company structure is presented in appendix A3. Based on this structural framework, the concentration of west coast rock lobster fishery access rights is revisited by looking only at the consolidated company holding. This is presented in table 5.27 below.

Table 5.27: Concentration of west coast rock lobster access rights by consolidated companies for the year 2001.

	2001	
	Vessels	Fishers
Oceana Group		
Lamberts Bay Fishing (Oceana)	8	121
SA Sea Products (Oceana)	6	90
North Bay Fishing (Oceana)	4	62
Namaqua Fishing (Oceana)	2	54
St Helena Bay Fishing (Oceana)	2	30
Oceana Group	22	357
% of total	13%	21%
Lusitania Empowerment Companies (LEC) of the Lohe Galero Holding Company		
MFV Atlantic Ocean Vessel Co (LEC)	1	8
MFV Deus de Ajude Vessel Co (LEC)	1	10
MFV Jenny Ann Vessel Co (LEC)	1	8
MFV Santa Isabel Vessel Co (LEC)	1	18
MFV Statendam Vessel Co (LEC)	1	10
MFV Welgemoed Vessel Co (LEC)	1	10
Lusitania Empowerment Companies	6	64
% of total	4%	4%
Other consolidated companies		
Paternoster Visserye (Saldanha Group)	5	58
Marine Products/Foodcorp	1	6
Premier Fishing	3	23
Total Other consolidated companies	9	87
% of total	5%	5%
All consolidated companies		
All consolidated or LEC companies	37	508
% of total	22%	30%

Data source: FIHB (2001 & 2002)

The Lusitania Empowerment Companies are not strictly speaking part of a consolidated group. A more detailed description is provided in appendix A3, but, briefly, they all have the same board members, the crews own 15% of the vessels and the rest of the vessel companies are jointly owned by a number of quota holding companies. Basically even though they are separate companies, these companies are lumped together under the umbrella of the Lusitania Management Services subsidiary of the Lohe Galero Holding Company. The 22% vessel ownership and 30% fisher employment indicates that a fair amount of the total fishing power in this fishery is concentrated into the five consolidated companies appearing in table 5.27. An important element, however, is whether or not the amount of quota shares as a percentage of the TAC is similarly concentrated. The concentration of quota shares is dealt with next.

5.15.2 Quota Shares (Resource Rent)

First the quota shares of the large quota holders as a proportion of the TAC are added together but separated between large pre-1991 quota holders and new large quota holders (non-consolidated). Second, the percentage of the TAC that all large quota holders control gives an indication of the concentration in the fishery as a whole. This information is presented, indicating the quota share distributing institution, in table 5.28 below.

Table 5.28: The concentration of west coast rock lobster quota shares as a percentage of the TAC by non-consolidated company (1989 to 2002).

	Fishing Season													
	89	90	91	92	93	94	95	96	97	98	99	00	01	02
		Quota Board					Interim Quota Board				MLRA			
Pre-1991 large quota holders														
SA Sea Products	8.9	8.9	8.9	9.1	9.1	9.0	8.8	8.6	7.9	7.3	7.3	6.3	6.3	5.5
North Bay Fishing	7.3	7.3	7.3	7.3	7.5	7.4	7.3	7.1	6.6	6.1	6.1	5.2	5.2	4.6
Lamberts Bay Fishing	6.9	6.9	6.9	6.8	7.0	6.9	6.8	6.6	6.1	5.4	5.4	4.6	4.6	4.1
Marine Products (Foodcor)	2.0	2.0	2.5	2.5	2.4	2.5	2.5	2.4	2.2	2.0	2.0	3.4	3.4	3.0
Dromedaris Visserye	7.4	7.4	7.4	8.0	7.1	7.5	7.4	7.2	4.4	3.9	3.9	3.3	3.3	3.0
John Ovenstone	3.4	3.4	4.6		4.7	4.6	4.6	5.1	4.1	3.9	3.9	3.3	3.3	3.0
Stephan Rock Lobster Packers	4.5	4.5	4.5		4.6	4.6	4.5	4.4	4.0	3.6	3.6	3.1	3.1	2.8
Paternoster Vissery	3.0	3.0	3.0		3.5	3.5	3.4	3.4	3.1	2.7	2.7	2.3	2.3	2.1
Coast Trading	3.6	3.6	3.6	3.5	3.6	3.5	3.4	3.4	3.1	2.7	2.7	2.3	2.3	2.1
Chapman Peak Fish	3.1	3.1	3.1	3.1	3.2	3.1	3.1	3.0	2.8	2.5	2.5	2.1	2.1	1.9
Namaqua Fishing	2.7	2.7	2.3	2.3	2.4	2.4	2.3	2.6	2.1	1.8	1.8	1.6	1.6	1.4
Konsortium Kreef	2.3	2.3	2.3	3.8	2.3	2.4	2.3	2.3	2.1	1.9	1.9	1.6	1.6	1.4
Saldanha Bay Canning	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.4	1.3	1.3	1.2	1.2	1.1
Freidman & Rabinowitz	2.3	2.3	2.3	2.2	2.3	2.3	2.2	2.2	2.0	1.8	1.8	1.2	1.2	1.1
Kalk Bay Lobster & Commercial Line Fishing Association	0.7	0.8	0.8	1.4	1.4	1.4	1.4	1.3	2.4	1.1	1.1	1.0	1.0	0.9
% of the TAC	60	60	61	52	63	62	62	61	54	48	48	43	43	38
Large new quota holders														
S African Commercial Fishermens Corporation												3.5	3.5	3.1
Umoya Fishing													1.9	1.7
Southern Sea Fishing												1.7	1.7	1.6
St Helena Bay Fishing			2.0	6.7	2.0	2.0	2.0	1.9	1.8	1.6		1.3	1.3	1.2
Lobster Island Fishing (Pty) Ltd														1.2
% of the TAC			2.0	6.7	2.0	2.0	2.0	1.9	1.8	1.6		6.5	8.4	8.8
Large quota holders														
% of the TAC	60	60	63	58	65	64	64	63	56	49	48	49	51	47

Data source: FIHB (1989 to 2002)

The absolute proportion of the TAC controlled by large quota holders has decreased from 60% of the TAC in 1989 to 47% of the TAC in 2002. Consolidating the quota holders into corporate groups provides a picture of a concentrated fishery (table 5.29).

Table 5.29: West coast rock lobster quota shares of consolidated fishing companies as a percentage of the TAC (1989 to 2002).

	Fishing Season													
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
		Quota Board					Interim Quota Board				MLRA			
Oceana Group														
SA Sea Products	8.9	8.9	8.9	9.1	9.1	9.0	8.8	8.6	7.9	7.3	7.3	6.3	6.3	6.3
North Bay Fishing	7.3	7.3	7.3	7.3	7.5	7.4	7.3	7.1	6.6	6.1	6.1	5.2	5.2	5.3
Lamberts Bay Fishing	6.9	6.9	6.9	6.8	7.0	6.9	6.8	6.6	6.1	5.4	5.4	4.6	4.6	4.7
Stephan Rock Lobster Packers	4.5	4.5	4.5	0.0	4.6	4.6	4.5	4.4	4.0	3.6	3.6	3.1	3.1	3.2
Namaqua Fishing	2.7	2.7	2.3	2.3	2.4	2.4	2.3	2.6	2.1	1.8	1.8	1.6	1.6	1.6
St Helena Bay Fishing	0.0	0.0	2.0	6.7	2.0	2.0	2.0	1.9	1.8	1.6	1.6	1.3	1.3	1.4
Coast Trading	3.6	3.6	3.6	3.5	3.6	3.5	3.4	3.4	3.1	2.7	2.7	2.3	2.3	2.4
% of the TAC	33.9	33.8	35.4	35.7	36.2	35.6	35.2	34.7	31.6	28.5	28.5	24.4	24.5	25.0
Premier Group														
Atlantic Fishing Ent			0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4
Chapman Peak Fish	3.1	3.1	3.1	3.1	3.2	3.1	3.1	3.0	2.8	2.5	2.5	2.1	2.1	2.1
John Ovenstone	3.4	3.4	4.6		4.7	4.6	4.6	5.1	4.1	3.9	3.9	3.3	3.3	3.4
John Quality	0.4	0.4	0.4		0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3
Premier												1.7	1.7	1.8
Southern Sea Fishing	2.5	2.5	2.5	2.9	2.6	2.5	2.5	2.4	2.2	2.0	2.0			
% of the TAC	9.4	9.4	10.9	6.3	11.2	11.0	10.9	11.3	9.8	9.0	9.0	7.8	7.8	8.1
Foodcorp														
Lighthouse Fisheries	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.2	1.1	1.1			
SA Lobster Exporters	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0	0.9	0.9			
Marine Products	2.0	2.0	2.5	2.5	2.4	2.5	2.5	2.4	2.2	2.0	2.0			
Foodcorp												3.4	3.4	3.5
% of the TAC	4.5	4.5	5.0	4.9	4.9	5.0	4.9	4.8	4.4	3.9	3.9	3.4	3.4	3.5
Saldanha Group														
Deseeda Seeprodukte													0.4	0.4
Saldanha Bay Canning	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.4	1.3	1.3	1.2	1.2	1.2
Paternoster Vissery	3.0	3.0	3.0		3.5	3.5	3.4	3.4	3.1	2.7	2.7	2.3	2.3	2.4
% of the TAC	4.6	4.6	4.6	1.6	5.2	5.1	5.0	4.9	4.5	4.0	4.0	3.5	3.9	4.0
LGH (Lusitania)														
Empowered Lusitania Companies														
Freidman & Rabinowitz	2.3	2.3	2.3	2.2	2.3	2.3	2.2	2.2	2.0	1.8	1.8	1.2	1.2	1.2
Konsortium Kreef	2.3	2.3	2.3	3.8	2.3	2.4	2.3	2.3	2.1	1.9	1.9	1.6	1.6	1.6
Live Rock Lobster Corp	1.0	1.0	1.0		1.0	1.0	1.0	1.0	0.9	0.8	0.8	0.7	0.7	0.8
Sparkor	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.1	1.0	1.0	0.7	0.7	0.7
Lusitania Empowerment Companies														
Cape Reef Products	1.1	1.1	1.1	1.6	1.1	1.1	1.1	1.1	1.0	0.9	0.9	0.7	0.7	0.8
Lobster Island Fishing														1.4
% of the TAC	8.0	8.0	8.0	8.9	8.0	8.0	7.9	7.8	7.1	6.3	6.3	4.9	4.9	6.5
Corporate quota holders														
% of the TAC	60	60	64	57	65	65	64	63	57	52	52	44	44	47

Data source: FIHB (1989 to 2002)

Five corporate companies controlled, up until 1996, over 60% of the TAC. The proportion of the TAC controlled by individual corporate fishing companies and the

corporate companies as a whole did not, however, substantially change during the Quota Board or Interim Quota Board time—there is some indication of a growing share of the TAC to corporate quota holders during the period between the Quota Board and the Interim Quota Board. As seems the normal trend, the power of the five corporations listed above was most seriously eroded during the Marine Living Resources Act institutions. The slight increase of corporate control from 44% to 47% of the TAC during 2002 was a result of all corporate companies being awarded a larger proportion of the TAC. One way of viewing this is that certain Black Economic Empowerment investment companies provided a favourable influence on the quota distributing body. One should also bear in mind that the distribution of the quota share during 2002 was conducted differently to the other distribution rounds under the Marine Living Resources Act (see chapter 2). The fact remains, however, that five companies still have command over at least 45% of the resource rent. The next task is to make some comment on the success of the redistribution strategies.

5.16 STRONG VS WEAK REDISTRIBUTION: THE WCRL FISHERY

To recap, strong redistribution requires a targeted redistribution of the resource rent (quota shares) and fishing capital (vessels and access rights), as well as a skills transfer. As is the case with all South Africa's TAC fisheries, the distribution of the resource rent in the form of quota shares is the major instrument used by the various institutions that have existed in the last decade. As in the abalone fishery, the purpose of this chapter is to examine if this weak redistribution strategy has had strong redistribution consequences.

Again, the number of quota shares determines the potential number of access rights[23] and if the quota shares are not divisible, their number places an upper bound on the number of fishing vessels exploiting west coast rock lobster. Also, the quota shares are usually owned by 'legal entities' that can be traded along with their quota shares, that is, quota shares are tradable. Similarly, access rights are fully tradable when a vessel is bought or sold. Essentially, however, quota shares still have to be privately

[23] Plasket's (2002:16) contention still holds, namely that access cannot 'constitutionally' be denied to a quota holder. The opposite, however, does not hold.

linked to access rights—quota shares in the TAC fisheries are not attached to vessels. They are in the terminology developed in the previous chapter short-term $UNATTACHED_{TAC}$ partially tradable quota shares. The first task is to examine the balance between quota shares, access rights (vessels) and the number of companies[24] holding access rights (figure 5.9). The point is to examine the potential for each quota holder to become a fisher with a fishing vessel, or to own a fishing vessel and be a fishing entrepreneur.

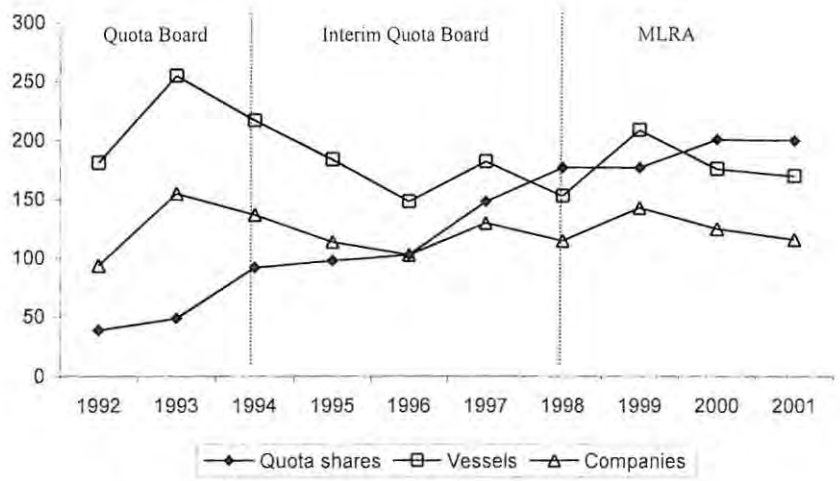

Figure 5.9: Vessels (access rights), companies (access right holding companies) and the number of quota shares in the west coast rock lobster fishery (1992 to 2001).
Data source: FIHB (1992 to 2002)

In the case of the west coast rock lobster fishery, the number of vessels has steadily fallen (due to a falling TAC and possible fishing over-capacity). The number of access right holding companies has, however, remained more or less constant, showing fluctuations with changes in the number of vessels employed in the fishery. This is probably a result of larger companies removing vessels from the west coast rock lobster fishery and deploying them in other fisheries, or simply just taking the opportunity of a low TAC to overhaul certain vessels. Smaller access right holding companies most likely also drop out of the fishery or change their access right status to enable exploitation in another fishery. The distance between the vessel and company line has also narrowed, indicating that the concentration of access rights is being eroded (evidence of this is presented in the previous sections).

[24] These companies are not consolidated into their corporate structures for this analysis.

The number of quota shares has increased throughout the decade—discussed in section 5.14 and 5.15.2. Certain observation from figure 5.9 are relevant, first, the number of quota shares equalled the number of access rights holding companies during 1996 falling under the Interim Quota Board and coinciding with the publishing of the White Paper that preceded the enactment of the Marine Living Resources Act of 1998. Taking into consideration fluctuations in the number of vessels entering or exiting the fishery due to, for example, environmental constraints, the number of quota shares increased only slightly during the Marine Living Resource Act. The number of commercial quota shares stabilized slightly above the number of vessels active during 2000 and 2001. The amount of commercial quota shares fell somewhat for the four-year term rights from 2002 to 2005 (not shown in figure 5.9), but 321 limited commercial quota shares were awarded. The scenario with more quota shares than vessels (access rights), albeit only slightly, coupled with the large number of limited commercial quota shares and the fact that access cannot be denied to a quota holder (that is, they can buy a vessel and harvest their own west coast rock lobster), means that a potential harvesting over-capacity problem exists in this fishery.

Taking into account the 13% of the TAC redistributed as limited commercial quota shares during 2002, new commercial quota holders in the same year controlled 43% of the TAC, slightly less than the 44% of pre-1991 quota holders. In other words, from a commercial point of view, just under one half of the resource rent has been redistributed to Black people—this assumes that White people were not recipients of the redistributed quota shares[25]. The number of vessels licensed to harvest west coast rock lobster that changed hands does provide some indication of the potential to realize a redistribution of fishing capital. New entrant access right holding companies (new vessel owners) from 1995 accumulated 40% of all vessels operating in the fishery during 2001. These companies only accounted for 32% of the number of fishers employed by 2001, indicating that the new entrant access right holding companies controlled smaller vessels. It is definitely not the case that historically repressed individuals or Black Economic Empowerment companies are these new

[25] There are a number of cases where quota shares have been redistributed to white people simply because it is very difficult for MCM to determine company ownership.

entrant companies, but it is true that, given access to capital, human skills and a quota share, at least 32% of the west coast rock lobster fishery (or 40% of the 'smaller' vessels) could have been appropriately redistributed. The ability of the historically repressed[26] to effectively operate a fishing vessel in the west coast rock lobster fishery is determined. The composite indicator of Black skills acquisition provides a number of 38% for full time skilled Black fishers.

In summary:

a The west coast rock lobster fishery faces a harvesting over-capacity problem simply by virtue of the fact that there are more quota shares than access rights.

b Approximately one half of the commercial quota shares have been redistributed by 2002.

c A cumulative 40% of the smaller vessels (with access rights) had changed hands by 2001, indicating a 'potential' ability to redistribute fishing capital.

d The human skills component in the west coast rock lobster fishery places a binding constraint of 32% on the ability of this fishery to experience a strong redistribution.

The fact that five consolidated fishing companies control 47% of the TAC and 22% of the access rights in the form of larger vessels (30% of the fishers) has an important bearing on strong redistribution in the fishery. The ownership of national corporations is subject to Black Economic Empowerment initiatives in the capital markets and employment equity criteria dictated by the Employment Equity Act. The policy decisions facing the fisheries authorities hinge on whether to leave the issues of strong redistribution to the capital market and other national strategies, or to actively pursue their own redistribution agendas. The increase in the number of quota shares and the information and additional costs necessary to track all transactions and catches and to enforce the environmental constraint brings fisheries management efficiency, in a similar manner to the abalone fishery, into question.

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[26] The educational and skills acquisition by Black people (Africa, Asian and mixed origin) in South Africa was until a decade ago severely restricted. The racial distribution of human capital is still very unequal and will probably remain so for some time—the lingering effects of apartheid on Black poverty and deprivation remain, hampering the ability to rapidly normalise the South African society.

5.17 SUMMARY: MICRO TO SMALL VESSEL TAC FISHERIES

The micro to small vessel TAC fisheries discussed above both experienced a broadening of the quota share base, but at different rates of change. Figures 5.10 and 5.11, below, shows these trends.

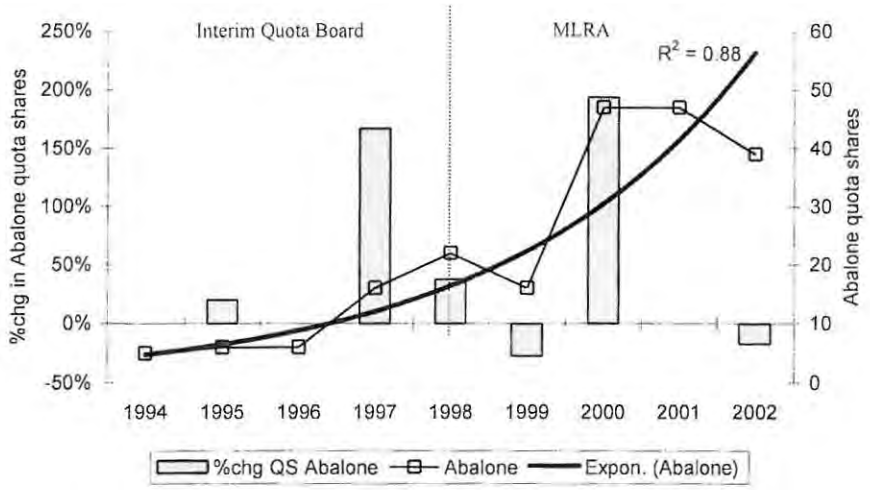

Figure 5.10: The exponential trend in broadening of the micro vessel abalone fishery quota share base.
Data source: FIHB (1994 to 2002)

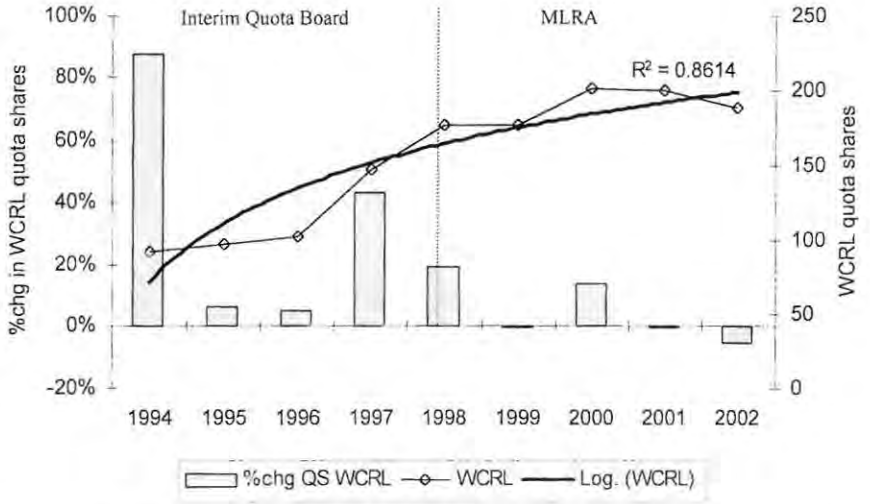

Figure 5.11: The logarithmic trend in broadening of the small vessel sized west coast rock lobster fishery.
Data source: FIHB (1994 to 2002)

With regard to figures 5.10 and 5.11, the rate at which the quota shareholding base[27] increased by adding new quota holders is different in each fishery.

a The broadening of the quota shareholding base (QS_b) started slowly during the Interim Quota board time and accelerated under the institutions of the Marine Living Resources Act.[28]

b The west coast rock lobster quota shareholding base grew at a decreasing rate over time, where most additional quota shares (qs) were added during the Interim Quota Board time.[29]

It should however be noted that, although the rates at which the quota shareholding base grew should reflect the intentions of the policy holders with regard to redistributing the resource rent, many quota holder that were added during the Quota Board and Interim Quota Board time were replaced with different quota holders under the Marine Living Resources Act of 1998. Also, and of crucial importance, is that in both cases as the quota shareholding base increased, the average, maximum and minimum asset sizes of necessity fell (dividing a more or less constant TAC[30] up into more quota shares). Also of considerable importance is that there is no statistical significance between the access rights base (number of vessels) and the quota shareholding base in either fishery—adjusted R^2 of 0.09 and 0.61 in the west coast rock lobster fishery and the abalone fishery respectively. The changes in the access rights base, as is previously emphasized, remain as a measure of the potential to redistribute fishing capital.

One of the important goals of this chapter is to develop some indication of the ability of the micro and small vessel TAC fisheries to undergo a strong redistribution within a binding environmental constraint, namely the TAC and other restriction determined in the form of rights. Table 5.30 provides a summary of the various distribution indicators that are derived in the chapter. For the two fisheries, the most current distribution indicators of access rights, skills, quota shares, asset sizes and control of

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[27] The quota shareholding base is the absolute number of quota shares awarded by the relevant fisheries authority during a particular time period. Limited commercial quota shares are not added into the quota shareholding base simply because it is uncertain whether or not they are targeted at subsistence fishers who have different harvesting rules.

[28] That is, at an increasing rate $QS_b = 2.97(e^{0.2892qs})$.

[29] $QS_b=76.76Ln(qs)+11.83$.

[30] In both fisheries the TAC fell over the decade analysed, which also contributed to the fall in asset sizes, but not as significantly as the effect of broadening the quota shareholding base.

the TAC between the pre-1991 economic agents and the new economic agents are provided.

Table 5.30: Redistribution indicators in the micro to small vessel TAC fisheries (2001, 2002).

		Abalone	WCRL
Vessel size		Micro	Small
Access Rights (% new entrants)	Holders (companies)	29%	44%
	Vessels (number of access rights)	21%	40%
	Fishers (employment)	27%	32%
Skills (composite indicator)	Full time	50%	38%
	Part time		34%
Quota shares % new quota holders		88%	86%
% of TAC held by new quota holders		51%	43%
New quota holder asset size[1]		22%	17%
% of TAC	Pre-1991 quota holders	40%	44%
	New commercial quota holders	51%	43%
	Limited commercial quota holders	19%	13%

Data source: FIHB (2001 & 2002), Mather et al (2002)
[1]: The average asset size of new quota holders divided by the average asset size of pre 1991 quota holders—does not include the limited commercial quota holders.

The small-vessel west coast rock lobster fishery does worse than the micro-vessel abalone fishery in all aspects of redistribution except the percentage of access rights held by new entrants. The access rights indicator simply illustrates the potential for the absorption of new entrant vessel owners into the fishery and is not a good indicator of the racial distribution of vessel ownership.

In both fisheries the skills base of Black fishers is the binding constraint on strong redistribution—50% for the abalone fishery and 38% for the west coast rock lobster fishery. This assumes that the policy of redistribution in these fisheries is based on the idea of enabling skilled fishers to i) capture the resource rents by being awarded a suitably large quota share and ii) have access to the fishing grounds by either leasing or buying a vessel. However, if the policy is to allow redistribution through capital market acquisitions of fishing corporations and companies by Black Economic Empowerment groups, the skills base does not place a constraint on redistribution.

The distribution of 88% and 86% of the quota shares to new commercial quota holders in the abalone and west coast rock lobster fisheries, coupled with a disproportionately small control of the TAC (51% and 43% in the abalone and west

coast rock lobster fisheries respectively) seems to negate the second policy option. This is captured in the new quota holder asset size indicator. The indicator is measured as a percentage of the average asset size of the quota shares held by new quota holders to that held by pre-1991 quota holders[31]. On average, new quota holders in the abalone fishery (not counting the limited commercial quota holders) and the west coast rock lobster fishery (also not including limited commercial quota holders) respectively hold asset sizes that are 22% and 17% as large as their pre-1991 quota holding counterparts—obviously not attractive to the capital market.

Although the evidence seems to demonstrate that fisheries authorities might encourage the empowerment of fishers, in fact few actual fishers have been awarded quota share. Given the small asset sizes and the tradability of the quota shares, the policy in this regard clearly points to a simple redistribution of the resource rent to a favoured group. Corporate fishing companies reflect the possibility of capital market Black Economic Empowerment in the control of the quota share and access rights. Table 5.31 below illustrates the extent of corporate control in the micro-vessel and small-vessel fisheries.

Table 5.31: Corporate control in the micro to small vessel TAC fisheries.

Corporate group	Abalone				WCRL			
	% TAC		Access Rights 2002		% TAC		Access Rights 2002	
	2001	2002	Vessels	Fishers	2001	2002	Vessels	Fishers
Oceana Group	15%	12%			25%	25%	13%	22%
Premier Group					8%	8%	2%	1%
Saldanha Group					4%	4%	2%	4%
Foodcorp Group	15%	12%			3%	4%	0.6%	0.4%
Irivin & Johnson	11%	9%						
Lusitania (LEC & ELC)[i]					5%	7%	4%	4%
Total Corporate	41%	33%	0%	0%	45%	47%	21%	31%
Fisher Organisations								
OCADA[ii]	17%	14%						
SACFC[iii]	4%	3%			4%	3%	4%	3%

Data source: FIHB (2002)

[i]: Lohe Galero Holdings (Lusitania) Company, LEC—Lusitania Empowerment Company ELC—Lusitania Empowered Company. ii: Overberg Commercial Abalone Divers Association. iii: South African Commercial Fishermens Corporation

[31] This is for the year 2002 distribution.

In both fisheries, corporate control over the TAC is significant. The corporate control in the west coast rock lobster fishery has, however, increased while it has decreased in the abalone fishery. This is probably a result of the accelerated redistribution strategy in the abalone fishery as described above. Finally, of note is the apparent absence of corporate ownership of vessels (and access rights) in the abalone fishery and a lower control of access rights than resource rents in the west coast rock lobster fishery. This phenomenon in the west coast rock lobster fishery is a possible result of the corporate fishing companies owning larger and more efficient vessels—the data on fishing power unfortunately is incomplete and this cannot be tested within the given data. For the abalone fishery, the capital costs of the micro-vessels are sufficiently low for most divers to own their own vessel and operate on behalf of the corporate processing companies. The possibility of using the structure of individual fishing rights to achieve strong redistribution goals is discussed in the final chapter.

5.19 CONCLUSION

In the terminology developed in chapter four, both fisheries are defined as short-term UNATTACHED$_{TAC}$ partially tradable quota share fisheries. However, there are a number of important differences in the two fisheries. A number of policy issues in the redistribution of resource rents and of strong redistribution are evident. The evidence also suggests that different policy strategies have been used in the two fisheries. What is very clear is that the informational requirements of both fisheries increase significantly with the creation of new quota shares of usually small asset sizes (which necessarily also makes the existing asset sizes smaller if these quota holders remain in the system). This, largely as a result of the structure of fishing rights, has resulted in organizational failure (chapter 2) and a consequent pre-occupation with organizational structures rather than the structure of individual user rights (except, of course, changing the 'right of participation' to favour entrepreneurs over fishers). These issues and the policy alternatives are discussed in chapter 8 along with the other important TAC fisheries.

The construction of the next chapter is very similar to this chapter, but it deals with the medium to large vessel fisheries, namely, the pelagic fishery, the inshore trawl fishery and the hake long-line fishery.

CHAPTER SIX
MEDIUM VESSEL TAC FISHERIES

6.1 INTRODUCTION

This chapter focuses on the main South African TAC fisheries that unitize fishing vessels greater than 14m and up to 35m—medium vessel TAC fisheries. The fisheries in this group are the pelagic fishery, the inshore trawl fishery and the hake long-line fishery (this fishery is only briefly covered because it only functionally began during 2000). As with the micro to small vessel fisheries the main aim is to determine, within the available data, the effect that a weak redistribution policy (redistributing the resource rent in the form of quota shares) has had on strong redistribution (of the fishing capital and quota shares and the accumulation of skills by Black fishers).

Each of the three fisheries is described within a similar format to that used in the micro to small vessel fisheries[1]. Being further out to sea, a subsistence fishery has not developed and the recreational fishery is negligible. The discourse on each fishery is developed along the following lines: first, an overview provides some of the detail not covered in the established format, second, a discussion on the structure of the appropriate fishing fleet, third, the access right (or licensed vessel) distribution, fourth, the skills distribution, fifth, the quota share distribution, sixth, the concentration of access rights and quota shares and finally, a discussion on strong versus weak redistribution. Where appropriate, these distribution patterns are described within the quota share distribution institution that operated at that time.

Again, this chapter concludes by comparing the distributional trends, redistribution results and concentration of access rights and quota shares in the three medium vessel fisheries. The policy options in terms of efficient systems with redistribution constraints are discussed, in comparison to the micro to small vessel fisheries and the large vessel fisheries, in chapter 8. The large vessel TAC fisheries are covered in chapter 7.

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[1] Where appropriate the standard tables and figures used in chapter 6 are repeated for each fishery; some, however, are placed into the appendices.

6.2 OVERVIEW: THE PELAGIC FISHERY

The South African small pelagic[2] fishery[3] is based on a short-lived multi-species resource consisting mainly[4] of anchovy (*engraulis capensis*) and pilchard (*sarninops sagax*). It is confined to the areas between latitude 31° S, near the Brak River in the Northern Cape, and longitude 21° E, around Cape Agulhas and usually within 20km of the coast (RSA[5], 2002). According to Heinecken (2002:4) the adult fish of both species aggregate on the Agulhas bank during the summer months to spawn. The eggs and larva are then transported up the west coast of southern Africa. Later the developing larva and juvenile fish move into the productive inshore regions. From late summer onwards they start migrating southwards down the coast to reach the Agulhas region as adults, arriving by spring and early summer. Anchovy reach their adult stage during their first year and can therefore be harvested when juveniles, but pilchard only reach maturity after two years and should not be harvested during their first year of growth[6], Heinecken, (2002:4). Because juvenile anchovy and pilchard shoal together, harvesting provides a resource management dilemma, namely "[u]nrestrained targeting of these shoals can easily result in over exploitation of pilchard while limited fishing can result in the under exploitation of anchovy" (Heinecken, 2002:4). To complicate matters further, this fishery experiences large fluctuations in the TAC, due to stock dynamics of the fish population and environmental factors. Suffice it to state that the determination of the biological constraint is difficult in this fishery[7].

While anchovy and round herring (*etrumeus whiteheadi*) are converted into fishmeal[8], about 90% of the pilchard catch is canned for human consumption and about 10% is

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[2] Upper layers of the sea.
[3] Large pelagic fish consist mainly of tuna.
[4] Other species harvested in the pelagic fishery are: redeye or round herring (*etrumeus whiteheadi*), light fish (*maurolicus muelleri*), Lantern fish (*lampanyctodes hectoris*) and pelagic goby (*sufflogobius bibarbatus*).
[5] Rule book on the pelagic fishery (RSA, 2001g).
[6] Pilchard do not spawn during their first year of life, therefore harvesting them increases substantially the risk of the fish stock collapsing.
[7] Recently the determination of an absolute TAC has been replaced with an 'operational management procedure' that "...sets the TAC with built-in flexibility." Mayekiso (in Warman, 2002:9).
[8] A small TAC is set aside for edible anchovy, see appendix A6.

used for bait. The harvest from the small pelagic fisheries contributes the greatest biomass of all the South African fisheries—during the last few years this was in the region of 120 000 tons per year, but it has been in the region of 600 000 tons, for example, in the 1986/87 fishing season. As is explained in chapter 2, the pelagic fishery has a split quota system, namely, between anchovy and pilchard. It also has a separate TAC for pelagic bait. Although many vessels hold access rights for both, the pelagic fleet harvesting anchovy and pilchard is treated separately from the fleet targeting pelagic bait.

6.3 STRUCTURE OF THE FLEET: PELAGIC FISHERY

The pelagic fishing fleet is not only multi-species in that it targets at least two small pelagic species (anchovy and pilchard) but most vessels hold other fishing licences as well. As illustrated in table 6.1, these include both effort-restricted species and TAC-restricted species.

a Most vessels in the pelagic fleet hold effort restricted licences. These are: hand-line (Hl), tuna (Tu), shark long-line (Shl), squid (Sq) and hake long-line (Dl), gurnard (Gu).

b The TAC restricted species are: pelagic purse seine (Pl), pelagic bait (Pb), live bait (Lb), edible anchovy (Ae) and west coast rock lobster (K).

Table 6.1: The multi-species nature of the pelagic fishing fleet (% of vessels with various licences to exploit different species—1992 to 2001).

Fishing access rights (licence)	Fishing Season									
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Pl	50.7%	26.6%	38.6%	35.9%	41.4%	25.9%	25.5%	26.7%	27.1%	27.0%
Pl,Hl	14.1%	6.3%	7.9%	7.6%	6.9%	7.4%	14.9%	9.3%	8.6%	9.5%
Pl,Tu	21.1%	9.1%	11.9%	14.1%	13.8%	8.6%		5.8%	2.9%	3.2%
Pl,Ae		3.5%	1.0%							
Pl,Hl,Tu	9.9%	0.7%	1.0%	3.3%	2.3%	2.5%	2.1%	2.3%	2.9%	3.2%
Pl,Hl,Shl				1.1%	1.1%					
Pl,Lb,Tu		0.7%	1.0%	1.1%						
Pl,Ae,Hl,Tu		1.4%	1.0%							
Pl+effort	95.8%	48.3%	62.4%	63.0%	65.5%	44.4%	42.6%	44.2%	41.4%	42.9%
Pl,Hl,K,Tu	1.4%									
Pl+TAC	1.4%									
Pl (all)	**97.2%**	**48.3%**	**62.4%**	**63.0%**	**65.5%**	**44.4%**	**42.6%**	**44.2%**	**41.4%**	**42.9%**
Pl,Pb	2.8%	0.7%	1.0%	4.3%	6.9%	16.0%	10.6%	18.6%	22.9%	19.0%
Pl,Pb,Ae		26.6%	1.0%	2.2%						
Pl,Pb,Hl					2.3%	4.9%	8.5%	4.7%	5.7%	6.3%

Fishing access rights (licence)	Fishing Season									
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Pl,Pb,Tu			1.0%	1.1%	2.3%	2.5%		3.5%	1.4%	1.6%
Pl,Pb,Hl,Tu		2.1%	4.0%	3.3%			2.1%	1.2%	1.4%	1.6%
Pl,Pb,Hl,Shl						1.2%		1.2%		
PL,Pb,Ae,+effort	2.8%	29.4%	6.9%	10.9%	11.5%	24.7%	21.3%	29.1%	31.4%	28.6%
Pl,Pb,K								1.2%	1.4%	1.6%
Pl,Pb+TAC								30.2%	32.9%	30.2%
Pl,Pb (all)	**2.8%**	**29.4%**	**6.9%**	**10.9%**	**11.5%**	**24.7%**	**21.3%**	**30.2%**	**32.9%**	**30.2%**
Pb						3.7%	4.3%	2.3%	2.9%	3.2%
Pb,Tu						1.2%	2.1%	1.2%	1.4%	1.6%
Pb,Hl		0.7%	2.0%	2.2%	3.4%	6.2%	4.3%	4.7%	2.9%	3.2%
Pb,Hl,Ae		1.4%	1.0%	1.1%						
Pb,Hl,Ae,Tu		0.7%								
Pb,Hl,Tu		2.8%	3.0%	3.3%	4.6%	1.2%		1.2%		
Pb,Hl,Sq				3.3%	2.3%	1.2%	2.1%	1.2%	1.4%	1.6%
Pb,Hl,Tu,Shl			1.0%	1.1%	2.3%	1.2%	2.1%	1.2%	1.4%	1.6%
Pb,Hl,Tu,Sq		4.9%	5.9%	3.3%	2.3%	2.5%	2.1%	2.3%	2.9%	3.2%
Pb,Hl,Sq,Shl						2.5%	4.3%	2.3%	2.9%	1.6%
Pb,Gu,Ae,Hl,Tu				1.1%						
Pb+effort		10.5%	12.9%	15.2%	14.9%	19.8%	21.3%	16.3%	15.7%	15.9%
Pb,K,Hl		0.7%	1.0%	1.1%		1.2%		1.2%		
Pb,K,Hl,Tu		0.7%	4.0%	3.3%	3.4%	2.5%	4.3%	2.3%	1.4%	1.6%
Pb,K,Hl,Tu,Sq		0.7%	1.0%	1.1%	1.1%	1.2%		1.2%	1.4%	1.6%
Pb,Ae,Hl,K,Tu		0.7%								
Pb,Ae,Hl,K,Tu,Sq		0.7%	1.0%							
Pb,Gu,Hl,K			1.0%	1.1%	1.1%					
Pb+TAC		3.5%	7.9%	6.5%	5.7%	4.9%	4.3%	4.7%	2.9%	3.2%
Lb,Hl					1.1%					
Lb,Tu		0.7%	1.0%	2.2%						
Lb,Hl,Tu		2.8%	2.0%			1.2%	2.1%	1.2%	1.4%	1.6%
Lb,Hl,Sq						1.2%	2.1%	1.2%	2.9%	3.2%
Lb,Ae,Hl,Tu		2.1%	3.0%							
Lb,Hl,Tu,Sq		1.4%	1.0%	2.2%	1.1%	2.5%	4.3%	1.2%	1.4%	1.6%
Lb,Hl,Tu,Sl			1.0%							
Lb,Hl,Tu,Sq,Shl		1.4%								
Lb+effort		8.4%	7.9%	4.3%	2.3%	4.9%	8.5%	3.5%	5.7%	6.3%
Lb,K						1.2%				
Lb,Hl,K							2.1%	1.2%	1.4%	1.6%
Lb,Hl,Tu,Dl			1.0%							
Lb+TAC			1.0%			1.2%	2.1%	1.2%	1.4%	1.6%
Pb & Lb (all)		**22.4%**	**29.7%**	**26.1%**	**23.0%**	**30.9%**	**36.2%**	**25.6%**	**25.7%**	**27.0%**

Data source: FIHB (1992 to 2002)

The important observations from table 6.1 are:

a The dedicated anchovy and pilchard purse seine pelagic vessels (Pl) decreased between 1992 and 2001 from over 50% to 27% of the fleet.

b Over the same period the overlap between pelagic purse seine and pelagic bait—Pl, Pb (all) on table 6.1—increased from just less than 3% to just over 30% of the fleet.

c By 2001, the split between anchovy and pilchard purse seine vessels (Pl {all} on table 6.1) anchovy, pilchard and bait vessels (Pl,Pb {all} on table 6.1) and the bait vessels (Pb&Lb {all} on table 6.1) was 43:30:27 respectively.

Although there was a 30% overlap between the vessels licensed to harvest anchovy and pilchard and the bait vessels, each fleet is treated discretely. The purpose is that the quota shares are distributed along these lines and it makes sense to analyze them separately while being aware of the overlap. The structure of the anchovy and pilchard fleet is covered first.

6.3.1 Anchovy and Pilchard

Figure 6.1 below illustrates that the number of vessels holding pelagic purse seine fishing licences (access rights to harvest anchovy and pilchard) between 1992 to 2001 decreased. However, it also shows an increasing trend in the average fishing power, measured in Gross Registered Tonnage[9] (GRT) and Kilowatts[10] (Kwt) of the fleet.

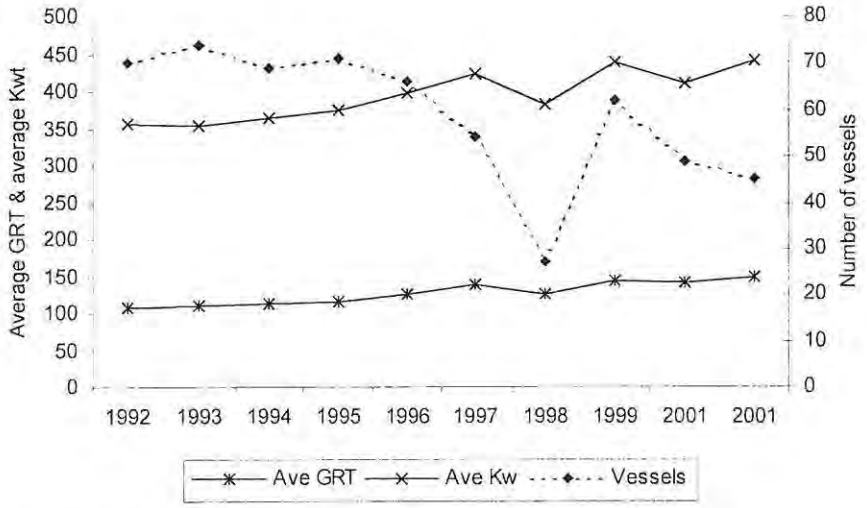

Figure 6.1: Trend showing the number of vessels and average fishing power per vessel (GRT and Kwt) in the anchovy and pilchard fishing fleet (1992 to 2001).
Data source: FIHB (1992 to 2002)

[9] The GRT measures the gross weight of the vessel.
[10] Kilowatts are a measurement of the engine power of the vessel.

Along with an increase in fishing power, table 6.2 illustrates that the average length and the average age of the vessels have increased over the same period. This indicates that the smaller, but younger, vessels drop out of the fleet when its size contracts, usually in response to a fall in the TAC. These trends along with the total number of vessels in the fleet and fishers employed are presented in table 6.2 below.

Table 6.2: Characteristics of the anchovy and pilchard fishing fleet (1992 to 2001).

	Fishing season									
	1992	1993	1994	1995	1996	1997	1998	1999	2001	2001
	Quota Board		Interim Quota Board					MLRA		
Average Length	23	23	23	23	24	24	23	25	25	25
Average age	18	19	19	21	20	21	20	22	21	23
Average GRT	107	110	112	115	126	139	125	143	141	149
Average Kwt	357	355	365	374	397	424	382	439	409	441
Vessels	70	74	69	71	66	54	27	62	49	45
Fishers	667	701	647	673	661	532	271	634	504	475

Data source: FIHB (1992 to 2002)

The total employment and the number of vessels active varies substantially: from 74 vessels and 701 fishers employed during 1993 to 27 vessels and 271 fishers employed during 1998—a 64% change. Based on the evidence of a highly variable TAC, the amplitude of the variations is not unexpected.

The full structure of the pelagic purse seine fleet targeting anchovy and pilchard is presented in appendix A6. The structure indicates that although the average fishing power of the fleet has increased along with average length and age, the median length of the vessels has remained within the >20m to 25m range. This indicates that the basic structure of the fleet has not substantially changed over the last decade—the majority of the vessels still fall within the medium sized >20m to 25m range.

6.3.2 Bait

There are fewer vessels in the pelagic bait fleet, mainly because the pelagic bait TAC is much smaller than the anchovy and pilchard TACs. Also, of importance is that over 50% of this fleet also holds licences to harvest anchovy and pilchard and a very small percentage are dedicated pelagic bait vessels (table 6.1).

Table 6.3 below indicates a similar pattern to vessels holding anchovy and pilchard access rights, namely increasing fishing power with longer but older vessels. The

variations in the number of vessels and employment of fishers are, however, not as pronounced and the average length is smaller.

Table 6.3: Characteristics of the pelagic bait fishing fleet (1992 to 2001).

	Fishing Season									
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
	Quota Board			Interim Quota Board					MLRA	
Average Length	16	19	20	20	19	22	22	22	22	23
Average age	18	19	22	21	21	19	20	21	22	23
Average GRT	43	74	78	82	75	109	112	116	115	121
Average Kwt	167	232	244	269	239	330	341	357	363	371
Vessels	17	38	39	35	30	44	25	47	41	36
Fishers	243	605	610	550	459	603	373	643	580	523
Average fishers	14	16	16	16	15	14	15	14	14	15

Data source: FIHB (1992 to 2002)

The structure of the fleet (appendix A6) shows a similar median size to the anchovy and pilchard fleet (>20m to 25m). However, the bait fleet has a higher proportion of smaller vessels in the <14m to 18m and >18m to 25m ranges than the anchovy and pilchard fleet. The fact, however, remains that both (overlapping) fleets fall directly into the medium-sized vessel range.

6.4 ACCESS RIGHTS: PELAGIC FISHERY

The distribution of access rights (fishing vessels) between new entrant companies and companies that existed during 1994 (1994 companies) is discussed for the anchovy and pilchard fleet and the bait fleet below. As is previously mentioned the racial distribution of company ownership is difficult to ascertain, but this exercise illustrates the potential for redistribution of access rights and fishing capital.

6.4.1 Anchovy and Pilchard

The trends in the company ownership of vessels with anchovy and pilchard access rights are presented in figure 6.2 and table 6.4 below. The three distributional institutions are demarcated[11]. Table 6.4 adds the number of vessels and fishers, as well as fishing power represented by GRT, to the trends shown in figure 6.2.

[11] It must be remembered that these institutions were never active in the distribution of access rights; they focused on the distribution of quota shares (resource rent).

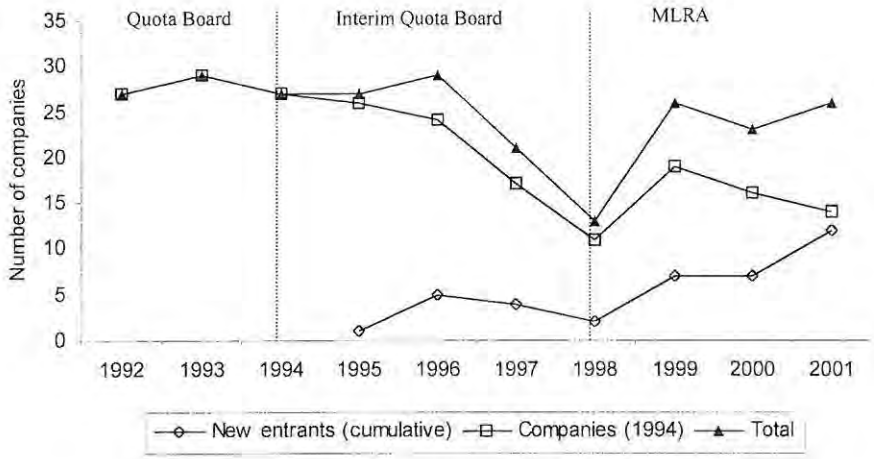

Figure 6.2: Change in access right holding companies or individuals in the anchovy and pilchard fishery (1992 to 2001).
Data source: FIHB

Table 6.4: Companies holding access rights to the anchovy and pilchard fishery (1992 to 2002).

		Fishing season									
		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
		Quota Board			Interim Quota Board					MLRA	
Successful new entrant companies	Companies				1	0	1	-1[a]	2	3	6
	Vessel				1	0	1	-1	3	6	6
	GRT				75	229	81	-304	619	1365	514
	Fishers				9	2	9	-11	37	72	65
Successful new entrant companies (cumulative)	Companies				1	1	2	1	3	6	12
	Vessel				1	1	2	1	4	10	16
	GRT				75	304	385	81	700	2066	2580
	Fishers				9	11	20	9	46	118	183
1994 Companies	Companies	27	29	27	26	24	17	11	19	16	14
	Vessel	70	74	69	70	61	50	25	54	38	29
	GRT	7482	8115	7756	8088	7665	6738	3287	7400	4800	4137
	Fishers	667	701	647	664	594	491	247	542	376	292
Unsuccessful new entrant companies	Companies					4	2	1	4	1	
	Vessel					4	2	1	4	1	
	GRT					315	363	19	745	52	
	Fishers					56	21	15	46	10	
Total	Companies	27	29	27	27	29	21	13	26	23	26
	Vessel	70	74	69	71	66	54	27	62	49	45
	GRT	7482	8115	7756	8163	8284	7486	3387	8846	6918	6717
	Fishers	667	701	647	673	661	532	271	634	504	475
% new entrants	Companies				3.7%	17.2%	19.0%	15.4%	26.9%	30.4%	46.2%
	Vessel				1.4%	7.6%	7.4%	7.4%	12.9%	22.4%	35.6%
	GRT				0.9%	7.5%	10.0%	3.0%	16.3%	30.6%	38.4%
	Fishers				1.3%	10.1%	7.7%	8.9%	14.5%	25.4%	38.5%

[a]: The negative number indicates that this company exited in 1998, but reentered later.
Data source: FIHB (1992 to 2002)

Figure 6.2 highlights that by 2001, an almost equal distribution of vessel owning and access right holding companies between new entrant and 1994 companies existed. Table 6.4 provides the important conclusion that most new entrant companies were eventually successful and by 2001 they represented 46% of all access right holding companies. However, the fishing power of the new entrant companies, in terms of owning fewer vessels, employing less fishers and holding a lower GRT, is lower than their 1994-company counterparts. In this regard, during 2001 new entrant companies employed 39% of all fishers, controlled 36% of all vessels (access rights) and commanded 38% of the gross registered tonnage of the fleet.

6.4.2 Bait

The bait fleet shows a slightly different trend where by 1998 the number of new entrant access rights holding companies equalled that of the 1994 companies (figure 6.3). This is probably a result of the different structure of the two (interconnected) fleets, namely a shorter average length and fewer actual access rights in the bait fleet than the anchovy and pilchard fleet

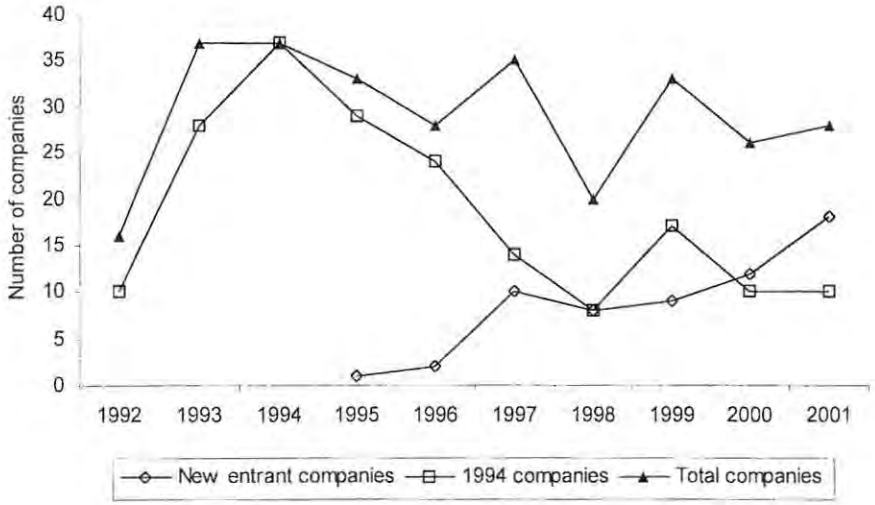

Figure 6.3: Change in access right holding companies in the bait fishery (1992 to 2001).

A large number of new entrant companies entered the fleet during 1997, which increased the total number of vessel (access right) holding companies during that year. A fall in the number of 1994 companies between 1997 and 1998 reduced the

total number of companies, but also four unsuccessful new entrant companies entered the fishery in this year, but had exited by 2001. These details are provided in table 6.5 below.

Table 6.5: Companies holding access rights to the bait fishery (1992 to 2002).

		Fishing season									
		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
		Quota Board			Interim Quota Board				MLRA		
Successful new entrant companies	Companies				1	1	8	-2	1	3	6
	Vessels				1	1	8	-2	1	4	5
	GRT				31	133	546	-125	317	356	457
	Fishers				28	6	133	-22	5	65	60
Successful new entrant companies (cumulative)	Companies				1	2	10	8	9	12	18
	Vessels				1	2	10	8	9	13	18
	GRT				31	164	710	585	902	1258	1715
	Fishers				28	34	167	145	150	215	275
1994 companies	Companies	10	28	37	29	24	14	8	17	10	10
	Vessels	11	29	40	31	26	22	13	30	23	18
	GRT	410	2637	3123	2552	1925	2805	1838	3940	3049	2654
	Fishers	178	482	619	478	400	312	190	408	312	248
Unsuccessful new entrant companies	Companies				3	2	11	4	7	4	
	Vessels				3	2	12	4	8	5	
	GRT				300	146	1303	380	604	388	
	Fishers				44	25	124	38	85	53	
Total	Companies	16	37	37	33	28	35	20	33	26	28
	Vessels	17	38	40	35	30	44	25	47	41	36
	GRT	685	3111	3123	2883	2235	4817	2803	5445	4695	4369
	Fishers	243	615	619	550	459	603	373	643	580	523
% new entrants	Companies				12%	14%	60%	60%	48%	62%	64%
	Vessels				11%	13%	50%	48%	36%	44%	50%
	GRT				11%	14%	42%	34%	28%	35%	39%
	Fishers				13%	13%	48%	49%	37%	46%	53%

Data source: FIHB (1992 to 2002)

The new entrant access rights holding companies made up 64% of all access right holding companies during 2001. However, these new entrant companies only held 50% of the access rights and controlled 39% of the fishing power (measured in GRT). They did, however, employ 53% of all fishers. The potential for a redistribution of fishing capital in this fishery, if taken as a percentage of vessels, that is, all access rights, is higher in the bait fishery (50%) than in the anchovy and pilchard fishery (36%).

6.5 SKILLS: PELAGIC FISHERY

An equitable racial distribution of fishing skills is vital for strong redistribution to occur in the fishery (this of course presumes that fishers are capable of signaling to MCM that they do have entrepreneurial skills as well as fishing skills). The skills distribution can provide a constraint on the potential distribution of fishing capital (vessels and access rights). If the fishing skills are not available within a racial group, then the skills pool puts an upper bound on the racial redistribution of fishing capital. Table 6.6 is derived in exactly the same way as for the micro-vessel abalone fishery and the small-vessel west coast rock lobster fishery. Data from Mather et al (2002) is not available for a separation of the anchovy and pilchard fleet from the bait fleet.

Table 6.6: Indicators of the racial distribution of fishing skills in the medium vessel TAC pelagic fishery.

	Skilled fishers			
	Full time		Part time	
	Black	White	Black	White
Average income[1]	R 20 000	R 52 000	R 22 500	R 24 000
% Black[2]	69.2%		41.5%	
Adjusted % Black	86.5%		51.9%	
Income differential	38.5%		93.8%	
Composite indicator	33.3%		48.7%	

[1&2]: Data Source: Mather et al (2002)

The composite indicator, which is a measure of the demographically adjusted racial distribution of employment of skilled fishers and weighted by an income difference, is 33.3% for full time fishers and 48.7% for part time fishers. This definitely places the upper bound on the potential for fishing capital redistribution. In the previous section, access right transfers were determined at 36% in the anchovy and pilchard fishery and 50% in the bait fishery.

6.6 QUOTA SHARES: PELAGIC FISHERY

6.6.1 Introduction

In this section the distribution of the resource rent as quota shares to new quota holders for anchovy, pilchard, and pilchard bait is discussed[12]. No TAC was allocated for anchovy during 1997 (Mayekiso in Stuttaford, 1997:6). In addition, data is missing for 1999 in all three species. The three quota share distribution institutions, the Quota Board, the Interim Quota Board and the Marine Living Resources Act of 1998 (MLRA) are indicated on the tables and figures and discussed where relevant.

6.6.2 Anchovy and Pilchard

The distribution of anchovy and pilchard quota shares between pre-1990 quota holders and new quota holders is displayed in figures 6.4 and 6.5 below.

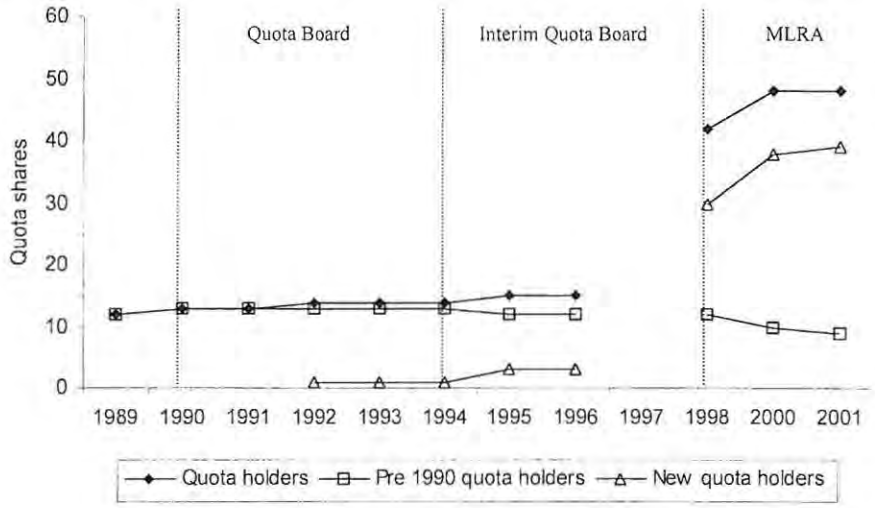

Figure 6.4: The distribution of pelagic (anchovy) quota shares between pre-1990 quota holders and new quota holders (1989 to 2001).
Data source, FIHB (1989 to 2002)

[12] Tables and a distribution trend figure for edible anchovy are presented in appendix A6.

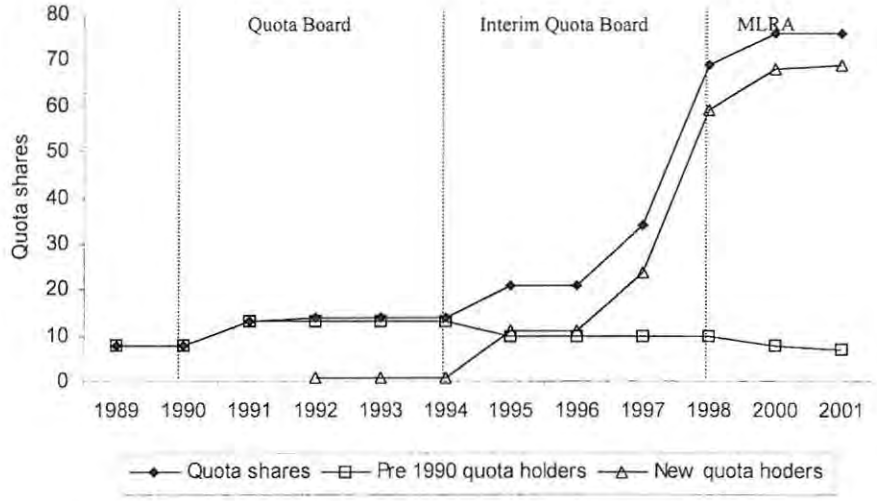

Figure 6.5: The distribution of pelagic (pilchard) quota shares between pre-1990 quota holders and new quota holders (1989 to 2001).
Data source, FIHB (1989 to 2002)

The quota share distribution patterns for both anchovy and pilchard are similar: very few new quota holders were introduced during the Quota board time, the quota share base was broadened during the Interim Quota Board and a slow-down in additional new quota holders occurred under the Marine Living Resources Act. The main difference between anchovy and pilchard distribution patterns is that many more new quota holders were introduced far more rapidly into the pilchard fishery (the rate of redistribution of quota shares was greater for pilchard than for anchovy). Details of the entry and exit of new quota holders are provided in tables 6.7 and 6.8 for anchovy and pilchard respectively.

Table 6.7: Distribution, entry and exit of anchovy quota holders (1989 to 2001).

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	2000	2001
		Quota Board					Interim Quota Board				MLRA	
Quota holders	12	13	13	14	14	14	15	15		42	48	48
Pre-1990 QH	12	13	13	13	13	13	12	12		12	10	9
New QH (s)					1	1	3	3	0	26	38	39
New QH (u)				1	0	0	0	0	0	4	0	0
Entry												
New QH (s)					1		2			23	12	1
New QH (u)				1						4		
Exit												
Pre-1990 QH							-1				-2	-1
New QH (u)					-1						-4	

QH: quota holder, (s) successful quota holders, (u) unsuccessful quota holders.
Data source: FIHB (1989 to 2002)

With regard to table 6.7 the following observations are made:

a One quota holder was added to the anchovy quota share base during 1990 and only one successful new quota holder[13] was added during the quota board time.

b The Interim Quota Board was more successful in broadening the quota share base. It added 25 new successful quota holders (who made it through to 2001) and four unsuccessful quota holders who lost their quota share in 2000.

c Although 13 new quota holders were added under the Marine Living Resources Act, four quota shares that were awarded during the Interim Quota Board period and one from a pre-1990 quota holder were revoked during this time.

Since 1991 four of the original 13 quota holders exited, or lost their quota share (one in 1993, two in 2000 and one in 2001). From 1994, 42 new quota holders were added of which 38 successfully made it through to 2001 (about a 90% success rate).

The distribution of pilchard quota shares followed much the same route except that proportionately far more quota shares were added both during the Interim Quota Board time and under the Marine Living Resources Act. This is illustrated in table 6.8 below.

Table 6.8: Distribution, entry and exit of pilchard quota holders (1989 to 2001).

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	2000	2001
		Quota Board					Interim Quota Board				MLRA	
Quota holders	8	8	13	14	14	14	21	21	34	69	76	76
Pre-1990 QH	8	8	13	13	13	13	10	10	10	10	8	7
New QH (s)					1	1	11	11	20	52	68	69
New QH (u)				1	0	0	0	0	4	7	0	0
Entry												
New QH (s)				1			10		10	32	10	1
New QH (u)									4	3		
Exit												
Pre-1990 QH							-3				-2	-1
New QH (u)					-1						-7	

QH: quota holder, (s) successful quota holders, (u) unsuccessful quota holders.
Data source: FIHB

[13] As is explained in chapter 4, successful new quota holders retained their quota share into the 2001 distribution round (2002 quota distribution occurs in mid-year and is therefore not published in the 2002 Fisheries Industry Hand Book—FIHB).

From a smaller quota share than the anchovy (eight as opposed to 13) pilchard quota shares increased to 76 by 2001 (anchovy increased to 48). The fact that more people hold pilchard quota shares than anchovy is somewhat puzzling, as both species shoal together and targeting one species usually includes an incidental catch (by-catch) of the other. The government scientists at MCM are aware of these problems and are developing various sophisticated methods to solve them (Mayekiso in Stuttaford, 2000:9). The pilchard distribution rounds since 1994 to 2002 have shown about a 90% success rate, that is, 63 of the 70 new quota shares awarded from 1994 were re-awarded in 2001.

As in all the fisheries the asset sizes are important, particularly when the number of quota shares is increased. The asset sizes are highly variable with the dynamic changes in the TAC. A table of the summary statistics on asset sizes from 1989 to 2001 is presented in appendix A6. For the pelagic fishery in particular, the proportion of the TAC redistributed to new quota holders, and the average asset size as a percentage of the TAC, is more useful. Tables 6.9 and 6.10 below show how the percentage of the TAC awarded to new quota holders has increased.

Table 6.9: Percentage of the TAC and average asset sizes in the distribution of anchovy quota shares (1991 to 2001).

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	2000	2001
		Quota Board				Interim Quota Board					MLRA	
TAC (100 tons)	3140	1500	1500	3480	3304	2380	1867	615		929	1206	3737
Quota holders	12	13	13	14	14	14	15	15		42	48	48
Pre-1990 quota holders												
Number of quota holders	12	13	13	13	13	13	12	12		12	10	9
% of TAC	100%	100%	100%	99%	99%	99%	95%	95%		64%	48%	34%
Average asset size as a % of TAC	8.3%	7.7%	7.7%	7.6%	7.6%	7.6%	8.0%	8.0%		5.4%	4.8%	3.7%
New quota holders												
Number of quota holders				1	1	1	3	3		30	38	39
% of TAC				1%	1%	1%	5%	5%		36%	52%	66%
Average asset size as a % of TAC				0.7%	0.8%	0.8%	1.5%	1.5%		1.2%	1.4%	1.7%

Data source: FIHB (1989 to 2002)

Although 79% of the quota shares were awarded to new quota holders in 2001, these quota holders commanded only 66% of the TAC. In addition, the 66% of the TAC is shared between 39 new quota holders. In comparison, the 10 pre-1994 quota holders divide between them 34% of the TAC. This is reflected in the average asset size of

the quota shares as a percentage of the TAC. On average, the pre-1991 quota holders were awarded smaller and smaller proportions[14] of the TAC, a move from 8.3% of the TAC per quota holder in 1989 to 3.7% of the TAC per quota holder in 2001. Alternatively, the average asset size awarded to new quota holders has increased[15] from 0.7% of the TAC per new quota holder to 1.7% of the TAC per new quota holder. The fact remains, however, that new quota holders were awarded asset sizes 45% of the size of their pre-1991 counterparts.

The trends for the pilchard TAC are presented in table 6.10. Similar to the anchovy TAC the percentage of the TAC awarded to pre-1991 quota holders has also fallen. However, less of the pilchard TAC has been redistributed, 41% of the TAC in 2001 as compared to 34% of the TAC for anchovy.

Table 6.10: Percentage of the TAC and average asset sizes in the distribution of pilchard quota shares (1991 to 2001).

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	2000	2001
		Quota Board				Interim Quota Board					MLRA	
TAC (100 tons)	165	350	280	270	232	231	615	654	767	953	1105	1597
Quota holders	8	8	13	14	14	14	21	21	34	69	76	76
Pre-1990 quota holders												
Number of quota holders	8	8	13	13	13	13	10	10	10	10	8	7
% of TAC	100%	100%	100%	97%	95%	96%	88%	88%	81%	65%	45%	41%
Average asset size as a % of TAC	12.5%	12.5%	7.7%	7.5%	7.3%	7.4%	8.8%	8.8%	8.1%	6.5%	5.6%	5.9%
New quota holders												
Number of quota holders				1	1	1	11	11	24	59	68	69
% of TAC				3%	5%	4%	12%	12%	19%	35%	55%	59%
Average asset size as a % of TAC				2.8%	4.7%	4.0%	1.1%	1.1%	0.8%	0.6%	0.8%	0.8%

Data source: FIHB (1989 to 2002)

Table 6.10 also shows that the average asset size awarded to both pre-1991 quota holders and new quota holders has decreased. The cause of this phenomenon, which shows a counter trend to the anchovy TAC, is that many more new quota holders were added to the quota share base in the pilchard fishery than in the anchovy fishery. The result is that the seven pre-1991 quota holders share 41% of the TAC where 69 new quota holders share 59% of the TAC. In other words, on average new quota holders

[14] During 1995 and 1996, during the Interim Quota Board time, the percentage of the TAC awarded to pre-1991 quota holders increased.

[15] This is apart from a small drop that occurred during the large increase in the number of new quota holders from 1998 to 2000.

are awarded quota shares with asset sizes that are 14% as large as their pre-1991 counterparts.

On balance, although more new pilchard quota holders have been added than anchovy quota holders, the pilchard quota holders share a smaller proportion of the TAC and accordingly have been awarded quota shares in smaller and smaller asset sizes. The opposite effect holds for the new anchovy quota holders who have got larger and larger asset sizes per quota share.

6.6.3 Bait

Over the period 1990 to 2001, 12 new quota holders were added. The major broadening of the quota holder base occurred during the Quota Board time; however, only 33% of the quota holders added were successfully re-awarded quota shares during 2001. The Interim Quota Board added five, two were unsuccessful, and a further five were added under the Marine Living Resources Act (table 6.11). In other words, after the quota share base was broadened most of the redistribution occurred in exchanging old quota holders for new ones. Five successful new quota holders were added during both the Interim Quota Board and under the Marine living Resources Act (see table 6.11 and figure 6.6).

Table 6.11: The distribution, entry and exit of pelagic bait quota holders (1990 to 2001).

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
	Quota Board					Interim Quota Board				MLRA		
Quota holders	24	23	20	28	32	33	33	33	33	32	32	
Successful quota holders												
1993 quota holders	17	17	17	28	29	29	29	29	27	23	21	
New quota holders					3	4	4	4	6	9	11	
Entry of new quota holders												
New quota holders (s)					1	1	1		3	3	2	
New quota holders (u)					2							
Exit of unsuccessful quota holders												
93 quota holders									-2	-4	-2	
New quota holders							-1		-1			

Data source, FIHB (1990 to 2002)

The striking thing about the distribution of pilchard bait quota shares is the steadily increasing asset size, a consequence of a larger portion of the pelagic TAC being

earmarked for pilchard bait (table 6.12 below). The asset size distribution trends are displayed in tabular form in appendix A4 and figure 6.6 below.

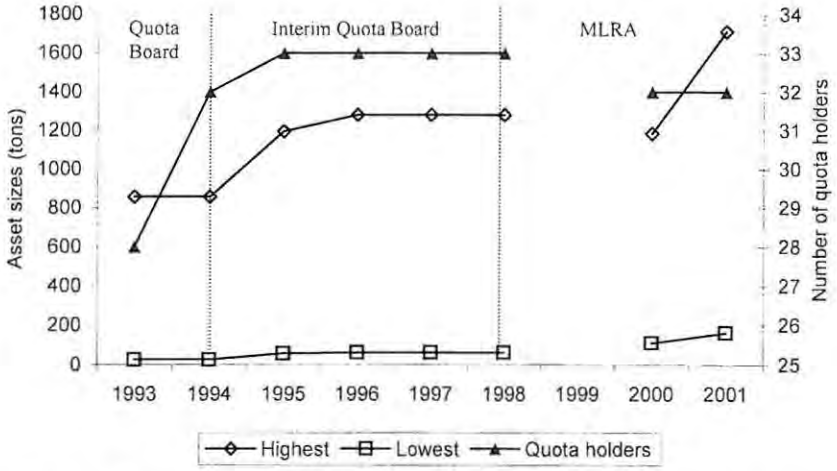

Figure 6.6: Minimum and maximum pelagic bait asset sizes and the number of quota holders (1993 to 2001).
Data source, FIHB (1993 to 2002)

Figure 6.6 illustrates an interesting trend where both the minimum and maximum asset sizes increase (TAC also increases) with the quota share base (the number of quota holders) during the Quota Board time. The distribution of the TAC between 1993 quota holders and new quota holders is shown in table 6.12.

Table 6.12: Distribution of the pilchard bait TAC and average asset sizes between 1993 quota holders and new quota holders.

	1993	1994	1995	1996	1997	1998	2000	2001
	Quota Board		Interim Quota Board				MLRA	
TAC	3650	4301	7582	8016	9166	9166	11442	16097
Quota shares	28	32	33	33	33	33	32	32
1993 quota holders								
Number of quota holders	28	29	29	29	29	27	23	21
% of TAC	100%	90%	87%	88%	88%	80%	70%	65%
Average asset size as a % of the TAC	3.6%	3.1%	3.0%	3.0%	3.0%	3.0%	3.1%	3.1%
New quota holders								
Number of quota holders		3	4	4	4	6	9	11
% of TAC		10%	13%	12%	12%	20%	30%	35%
Average asset size as a % of the TAC		3.3%	3.3%	3.1%	3.1%	3.4%	3.3%	3.2%

Data source, FIHB (1993 to 2002)

As a percentage of the TAC the average asset sizes of both the new quota holders[16] and those that held quota shares during 1993 have remained more or less equivalent. Since 1996 the new quota holders held a consistent 0.1% more on average per quota holder than the 1993 quota holders. However, only 35% of the TAC is distributed to new quota holders.

The control over the TAC and access rights in the next section should throw some additional light on the trends in anchovy, pilchard and pilchard bait quota shares discussed in this section.

6.7 CONTROL: PELAGIC FISHERY

This section is primarily concerned with the corporate control of both the fishing capital (vessels with access rights) and the resource rent (quota shares) in the fishery.

6.7.1 Access Rights (Fishing Capital): Anchovy and Pilchard

The corporate control of fishing capital in the form of vessels with licences to catch anchovy and pilchard (access rights) is determined for the year 2001 in table 6.13 below. Appendix A3 gives the derived corporate structures.

Table 6.13 below illustrates that, of the 26 companies operating in this fishery during 2001, the five fishing corporations held a total of 62% of all access rights in the fishery, controlled in the region of 70% of the fishing power (71% of the GRT and 69% of the engine power in kilowatts—Kwt) and employ 63% of all fishers. This translates to about 20% of the fishing companies owning 63% of the access rights and 70% of the fishing power.

[16] New quota holders did not have a quota share during 1993.

Table 6.13: Corporate control of vessels holding access rights to harvest anchovy and pilchard quota shares (2001).

	2001			
	Vessels	GRT	Kwt	Fishers
Oceana Group				
St Helena Bay Fishing	4	1133	2888	45
SA Sea Products	4	468	1662	41
Lamberts Bay Canning	4	424	1461	40
Oceana Group	12	2025	6011	126
% of total	27%	30%	30%	27%
Saldanha group				
Paternoster Visserye	1	100	372	9
Saldahna Bay Canning	1	140	440	10
Eigelaar AFJ & Seuns[1]	3	278	848	28
West Point Fishing	1	138	422	10
Saldahna group	6	656	2082	57
% of total	13%	10%	10%	12%
Premier Fishing				
Premier Fishing	5	950	2750	52
% of total	11%	14%	14%	11%
Foodcorp				
Foodcorp	4	616	1883	39
% of total	9%	9%	9%	8%
Sea Harvest				
Altantic Trawling	1	525	890	24
% of total	2%	8%	4%	5%
Total Corporate				
Total Corporate	28	4773	13616	298
% of total	62%	71%	69%	63%

[1]: Heinecken (2002:11) asserts that the Eigelaar group is a majority shareholder in the Saldanha Group.
Data source, FIHB (2002)

6.7.2 Quota Shares (Resource Rent): Anchovy and Pilchard

Because anchovy and pilchard quota shares were awarded separately, the corporate control of the anchovy TAC and the pilchard TAC is presented in tables 6.14 and 6.15 respectively.

With regard to table 6.14, the control of the resource rent in terms of the proportion of the anchovy TAC, five fishing corporations controlled 44% during 2001 and 35% during 2002, which is considerably lower than the control of fishing capital and access rights. Of the 48 quota holders in 2001, the five corporations accounted for 10 quota holders under various subsidiaries and associates, that is, the corporations make up about 21% of the total quota holders.

Table 6.14: Control of anchovy quota shares as a percentage of the TAC (1989 to 2001).

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
		Quota Board					Interim Quota Board				MLRA		
Oceana Group													
Lamberts Bay Fishing	12%	13%	11%	11%	10%	10%	14%	13%	11%		9%	1%	
St Helena Bay Fishing	8%	3%	8%	8%	7%	8%	5%	8%	6%		5%	5%	
SA Sea Products		11%	10%	9%	9%	9%	12%	11%	9%		8%	7%	
Sandy Point	6%	6%	5%	5%	5%	5%							
% of TAC	26%	33%	34%	34%	31%	31%	31%	32%	26%		23%	12%	
Saldanha Group													
Paternoster Visserye	5%	6%	4%	4%	3%	4%	3%	3%	3%		2%	2%	
West Point Fishing Corp												4%	
West Point Processors	7%	6%	7%	7%	6%	6%	6%	6%	5%		4%		
Saldanha Bay Canning	7%	6%	6%	6%	6%	6%	5%	5%	4%		4%	4%	
% of TAC	19%	18%	17%	17%	16%	16%	15%	15%	11%		10%	10%	
Premier Fishing													
Premier Fishing SA											3%	4%	
Premier Fishing SA											4%	4%	
Southern Sea Fishing	8%	7%	8%	7%	7%	7%	6%	5%	3%				
% of TAC	8%	7%	8%	7%	7%	7%	6%	5%	3%		7%	8%	
Foodcorp													
Marine Products	10%	7%	9%	9%	8%	8%	6%	5%	2%		3%	4%	
Gansbaai Marine	8%	8%	8%	7%	7%	6%	5%	4%	0.3%		1%	2%	
% of TAC	18%	15%	17%	17%	15%	15%	12%	10%	2%		4%	6%	
Pioneer Fishing													
Saco Fishing					1%	1%	1%	1%					
% of TAC					1%	1%	1%	1%					
% of TAC All													
Corporate	72%	73%	75%	75%	69%	69%	64%	63%	43%		44%	35%	

Data source: FIHB (1989 to 2002)

Five corporate fishing companies controlled 43% of the pilchard TAC during 2001 (table 6.15 below). Of the 76 quota holders during 2001, the fishing corporations accounted for 10 of them, or 13%. Fishing corporate control over the pilchard TAC is considerable greater than over the anchovy TAC, namely, 13% of the incorporated quota holding companies (making up five corporate fishing companies) controlled 43% of the TAC during 2001.

Table 6.15: Control of pilchard quota shares as a percentage of the TAC (1989 to 2001).

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
			Quota Board				Interim Quota Board				MLRA		
Oceana Group													
Lamberts Bay Fishing			3%	9%	8%	8%							
St Helena Bay Fishing			8%	7%	6%	6%	24%	24%	22%	18%		15%	14%
SA Sea Products			9%	8%	7%	7%							
Sandy Point			5%	4%	4%	4%							
Oceana	24%	31%											
% TAC	24%	31%	24%	27%	25%	24%	24%	24%	22%	18%		15%	14%
Saldanha Group													
Paternoster Visserye			4%	3%	3%	3%	3%	3%	3%	2%		2%	2%
West Point Fishing Corp													3%
West Point Processors	5%	7%	6%	6%	5%	5%	5%	5%	5%	4%		3%	
Saldanha Bay Canning	5%	6%	6%	5%	5%	5%	5%	5%	5%	4%		3%	3%
% TAC	10%	13%	16%	14%	13%	12%	13%	13%	12%	10%		8%	8%
Premier Fishing													
Premier Fishing SA												4%	5%
Premier Fishing SA												3%	3%
Southern Sea Fishing	6%	8%	7%	6%	6%	5%	7%	7%	7%	5%			
% TAC	6%	8%	7%	6%	6%	5%	7%	7%	7%	5%		7%	8%
Foodcorp													
Marine Products	9%	12%	8%	7%	7%	7%	9%	10%	9%	7%		6%	6%
Gansbaai Marine	36%	17%	21%	22%	26%	29%	13%	12%	11%	9%		8%	7%
% TAC	45%	29%	30%	30%	33%	36%	22%	22%	20%	17%		13%	13%
Pioneer Fishing													
Saco Fishing					5%	4%	4%	3%	3%	2%		2%	2%
Pioneer Fishing (East Coast)												2%	2%
% TAC					5%	4%	4%	3%	3%	2%		3%	3%
% TAC All													
Corporate quota holders	86%	81%	77%	77%	77%	78%	66%	66%	62%	51%		43%	43%

Data source: FIHB (1989 to 2002)

The incorporated fishing companies control 35% and 43% of the anchovy and pilchard TAC respectively. However, corporate fishing companies control 63% of access rights and 70% of the fishing power. The corporate companies make up 35% of all access right holding companies, 21% of all anchovy quota holders and 13% of all pilchard quota holders.

6.7.3 Access Rights (Fishing Capital): Bait

During 2001 (table 6.16 below) ownership of fishing capital and access rights by corporate fishing companies in the bait fishery was 36% of all vessels (access rights) and 53% of the fishing power.

Table 6.16: Corporate control of vessels holding access rights to harvest pelagic bait (and other species) quota shares (2001).

	2001			
	Vessels	GRT	Kwt	Fishers
Oceana Group				
St Helena Bay Fishing	3	1028	2573	36
SA Sea Products	3	369	1345	31
Lamberts Bay Canning	2	207	634	20
Oceana Group	8	1604	4552	87
% of total	22%	37%	35%	17%
Premier Fishing				
Premier Fishing	1	93	394	10
% of total	3%	2%	3%	2%
Foodcorp				
Foodcorp	4	616	1883	39
% of total	11%	14%	15%	7%
Total Corporate				
Total Corporate	13	2313	6829	136
% of total	36%	53%	53%	26%

Data source: FIHB (2002)

Out of a total of 28 companies, three fishing corporations with five subsidiary or associate companies account for 18% of all access right holders.

6.7.4 Quota Shares (Resource Rent): Bait

During 2001 the seven corporate quota holders, with a total of 11 subsidiaries or associates, controlled 40% of the TAC during 2001. The interesting fact about the distribution of the pelagic bait TAC over the years is that, since the Interim Quota Board time, the share of the TAC going to corporate fishing companies has remained relatively stable. This is illustrated in table 6.17 below.

Table 6.17: Control of bait quota shares as a percentage of the TAC (1989 to 2001).

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
	Quota Board					Interim Quota Board				MLRA		
Oceana Group												
Lamberts Bay Fishing				0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	
St Helena Bay Fishing				0.3%	0.2%	0.2%	0.2%	0.2%	0.2%	0.1%	0.1%	
SA Sea Products				23%	20%	16%	16%	14%	14%	10%	11%	
				24%	20%	16%	16%	14%	14%	11%	11%	
Saldanha Group												
Paternoster Visserye				2%	2%	2%	2%	1%	1%	1%	1%	
Eigelaar A J F	4%	4%	4%	2%	2%	3%	3%	3%	3%	3%	3%	
	4%	4%	4%	4%	4%	5%	5%	5%	5%	4%	4%	
Premier Group												
Premier Fishing										5%	5%	
Chapmans Peak	8%	7%	8%	4%	4%	3%	3%	3%	3%	6%	6%	
Atlantic Fishing Ent	3%											
	11%	7%	8%	4%	4%	3%	3%	3%	3%	10%	11%	
Lohe Galero Holdings												
Lusitania Fishing	4%	4%	4%	6%	5%	6%	6%	6%	6%	4%		
LEC												
Mount Pleasant Fishing											4%	
Vermont Fishing											3%	
	4%	4%	4%	6%	5%	6%	6%	6%	6%	4%	7%	
Foodcorp												
Marine Products				4%	4%	3%	3%	3%	3%	2%	2%	
				4%	4%	3%	3%	3%	3%	2%	2%	
Pioneer Fishing												
Saco Fishing				8%	7%	5%	6%	5%	5%	5%	5%	
Saco Fishing				2%	2%	2%	2%	2%	2%			
				10%	9%	7%	7%	7%	7%	5%	5%	
Corporate quota holders												
Corporate quota holders	19%	15%	16%	54%	45%	39%	40%	36%	36%	36%	40%	

Data source: FIHB (1990 to 2002)

6.8 STRONG VS WEAK REDISTRIBUTION: PELAGIC FISHERY

To recap, strong redistribution occurs when the fishing capital (vessels and access rights), resource rents (quota shares) and fishing skills are transferred from one group to another. The above sections have provided estimates of the potential for the redistribution of fishing capital, the state of fishing skills transfer to Black fishers and the extent of quota share redistribution.

In all South African TAC fisheries the number of quota shares provides an indication of the number of fishing vessels that may potentially enter and hold access rights to the fishery in question. Also, to recap, all TAC quota shares in South Africa are

defined in the terms developed in chapter 4, namely, as short-term $UNATTACHED_{TAC}$ partially tradable quota shares.

Concern regarding over-capacity should be raised if the number of quota shares exceeds the number of vessels in the fishery. With regard to the pelagic fishery, most of the fishing vessels hold access rights to a number of different species (table 6.1) and a clear indication of capacity is difficult to measure without good catch statistics per vessel. Also the highly variable nature of the TAC for anchovy and for pilchard makes capacity management almost impossible.

The primary boundary to strong redistribution is the level of skills acquisition by Black fishers, that is, Black fishers must be able to operate a fishing vessel and be able to undertake the necessary business transaction required to keep the vessel financially viable. A composite indicator to measure the extent of skills transfer to Black fishers, applicable to the entire pelagic fishery, was calculated to be 33.3% for full-time fishers and 48.7% for part-time fishers. A general conclusion based on the composite indicator is that strong redistribution probably cannot exceed 40% in the pelagic fisheries.

6.8.1 Anchovy and Pilchard

The proportion of pelagic vessels with access rights to harvest anchovy and pilchard is one indicator to determine the potential for the transfer of fishing capital from one group to the other. By 2001, new entrant fishing companies had accumulated 36% of the vessels in the fleet and 38% of the fleet's fishing power. Although the data shows that 36% of all access right holding companies have changed hands, the actual number of these companies has remained relatively stable (see figure 6.7 below).

The redistribution of the resource rent (quota shares) is not linked to holders of access rights; they are however the major redistribution instrument used by MCM. By 2001:

a Of the 76 quota shares available from the pilchard TAC, 69 new quota holders controlled 59% of the TAC. The remaining 41% of the pilchard TAC was shared (but not equally) between seven old quota holders.

b 66% of the anchovy TAC was distributed to 39 new quota holders. The remaining nine old quota holders controlled 34% of the TAC.

Figure 6.7 below provides an illustration of the distribution of access rights (vessels), access right holders (companies) and quota shares of anchovy and pilchard.

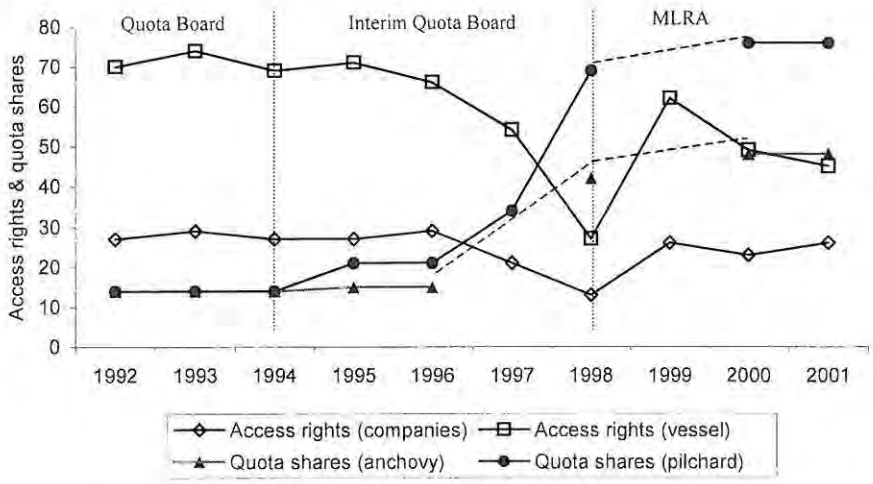

Figure 6.7: Vessels (access rights), companies (access rights holding companies) and quota shares in the anchovy and pilchard fishery (1992 to 2001).
Data source: FIHB (1992 to 2002)
Note: dashed lines for quota shares estimated.

Figure 6.7 above shows that the number of quota shares for both pilchard and anchovy increased most rapidly between 1996 and 1998 (the latter half of the Interim Quota Board time). It is also during this time that the number of quota shares in both anchovy and pilchard exceeded the number of access right holding companies. By 2001, the number of anchovy quota shares just exceeded the number of vessels active in the fishery, but the number of pilchard shares exceeded both the number of vessels and the number of pilchard quota shares. The distribution strategy must therefore be aimed at encouraging new quota holders to lease their quota share or to build new vessels. Alternatively, there exists a potential over-capacity problem if all new quota holders 'invest' in the fishery and acquire new vessels. Since 1997 the number of quota holders exceeded the number of active vessels.

6.8.2 Bait

The entry and exit of vessels with bait fishing licences is to a large extent dependant on the reaction of the entire pelagic fleet to changes in the TAC, that is, to exogenous environmental changes that affect the rejuvenation of the pelagic stocks. Figure 6.8

provides a picture of the distribution of quota shares and the fluctuations, in response to the environment, of access rights and access right holding companies.

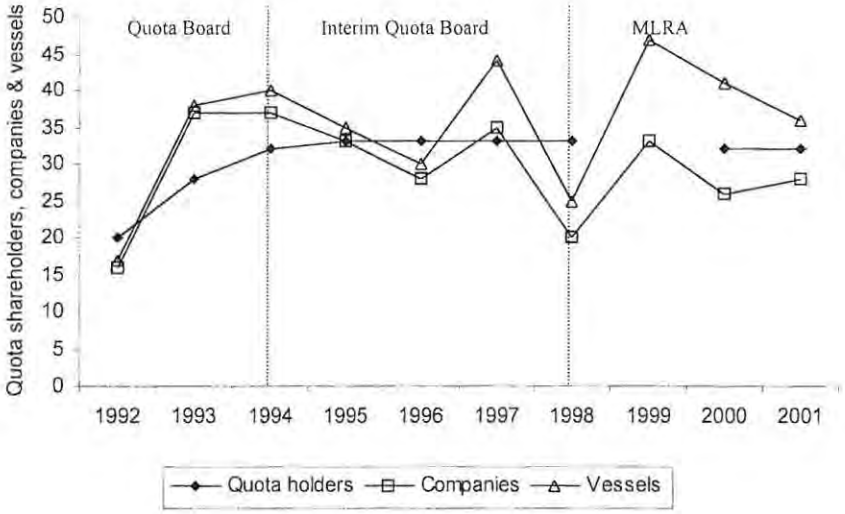

Figure 6.8: Vessels (access rights), companies (access rights holding companies) and quota shares in the bait fishery.
Data source: FIHB (1992 to 2002)

Figure 6.8 above clearly indicates that the number of quota shares increased during the Quota Board time and remained stable thereafter. Of the 32 pilchard bait quota shares distributed during 2001, 35% of the TAC went to 11 new quota holders (those that were allocated quota shares after 1993). The number of quota holders has remained more or less consistent with the number of active vessels.

6.9 OVERVIEW: THE INSHORE TRAWL FISHERY

The inshore trawl fishery extends seawards to a maximum of 110m in depth[17] between the Great Kei River and Cape Agulhas. All bay areas are also excluded from inshore trawl operations. Most inshore trawl vessels operate out of Mossel Bay (90%) and Port Elizabeth (10%). Hecht and Bross (2002:67) attribute this split to the abundance of sole in the Mossel Bay area.

[17] Deepsea trawlers are not allowed to harvest in waters less than 110m in depth.

The important aspects that distinguish the inshore trawl fishery are i) a split quota between two species and ii) a quota split in the hake species. First, the quota share distributions are split between an Agulhas sole (*austroglossus pectoralis*) TAC and a shallow water hake (*merluccius capensis*) TAC. Quota holders of sole are quota holders of hake, but different quota holders are allocated a combination of hake and sole in different asset size proportions (see section 6.13). Second, according to Hecht and Bross (2002:53), the global hake TAC is divided into a deepsea hake (*merluccius paradoxus*) trawl TAC (see chapter 8), inshore hake trawl TAC, a hake long-line (a mixture of *m.paradoxus* and *m.capensis*) TAC and a hake hand-line (*m.capensis*) TAC. They also (2002:85-87) point out that those companies using trawl operations to harvest the hake resource are usually vertically integrated large consolidated companies that specifically beneficiate the hake catch to meet market demands[18].

The South East Coast Inshore Fishing Association represents the private interests in the inshore trawl fishery. Their mandate is to further the interests of the inshore trawling industry and negotiate on behalf of all quota holders with MCM. The inshore trawl fishery also limits effort by imposing mesh size limitations (75mm) on their nets and incidental catch controls. Hecht and Bross (2002:49) point out that catch enforcement, monitoring and control are considered to be effective due to port controls and landing point restrictions.

6.10 STRUCTURE OF THE FLEET: INSHORE TRAWL FISHERY

The access right licences for the inshore trawl fleet between 1992 and 2001 are summarized in appendix A7, which shows that the majority of inshore trawl vessels (between 74% and 94%) hold inshore trawl access rights along with effort based licenses (mainly hand-line, not hake and tuna). The structure of the inshore trawl fleet, with outliers removed, is illustrated in table 6.18 below[19].

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[18] This vertically integrated industrial structure is not, however, unique to the fisheries harvesting hake. It is, however, true that most hake long-lined, or hand-lined, is sold whole (Hecht and Bross, 2002:49-51) and not beneficiated further.

[19] Appendix A7 has the complete fleet structure.

Table 6.18: The structure of the inshore fishing fleet—single vessel outliers removed and median size vessels highlighted (1992 to 2001).

		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
>12 to 14 (small)	Avg length	13	12	13	13	13	13	14	13	13	13
	Avg age	4	9	4	5	1	2	4	4	9	10
	Avg GRT	23	23	23	23	24	24	24	24	24	24
	Ave Kwt	93	116	118	118	150	150	152	150	150	152
	Vessels	1	2	2	2	5	5	4	5	6	5
	Fishers	12	24	24	24	42	43	38	46	52	46
	Avg fishers	12	12	12	12	8	9	10	9	9	9
>14 to 18 (medium)	Avg length	16	16	16	15	16	16	16	16	16	16
	Avg age	17	15	23	21	10	11	16	13	11	12
	Avg GRT	35	36	35	36	42	42	40	43	52	52
	Avg Kwt	247	264	238	257	283	283	332	283	287	287
	Vessels	5	4	4	3	3	3	2	4	5	5
	Fishers	75	63	58	38	37	37	26	42	54	54
	Avg fishers	15	16	15	13	12	12	13	11	11	11
>18 to 20 (medium)	Avg length	19	19	19	19	20	20	20	20	20	20
	Avg age	19	22	19	16	21	22	23	24	11	29
	Avg GRT	68	64	64	71	71	71	71	71	77	70
	Avg Kwt	297	276	312	340	327	327	327	327	385	259
	Vessels	4	5	4	3	2	2	2	2	1	2
	Fishers	36	54	34	28	20	20	20	20	12	29
	Avg fishers	9	11	9	9	10	10	10	10	12	15
>20 to 25 (medium)	Avg length	22	22	22	22	22	22	22	22	22	22
	Avg age	24	26	27	25	26	25	29	27	29	30
	Avg GRT	76	75	75	81	81	79	81	78	74	73
	Avg Kwt	293	284	285	306	312	329	308	317	312	312
	Vessels	29	26	23	23	17	15	14	15	13	13
	Fishers	322	289	261	257	168	162	148	156	136	132
	Avg fishers	11	11	11	11	10	11	11	10	10	10
>25 to 30 (medium)	Avg length	28	28	28	28	29	28.8	28	29	29	29
	Avg age	24	27	28	26	29	0.0	29	29	30	31
	Avg GRT	152	139	139	142	139	152	142	159	159	159
	Avg Kwt	602	496	496	520	496	602	520	653	653	653
	Vessels	4	3	3	3	4	5	3	4	4	4
	Fishers	40	36	36	44	56	68	44	56	56	56
	Avg fishers	10	12	12	15	14	13.6	15	14	14	14

Data source: FIHB (1992 to 2002)

The median vessel length >20m to 25m has remained unchanged since 1992. The age of the median vessel size group has, however, increased from 24 years in 1992 to an average of 30 years in 2001, indicating a slow reinvestment rate (an average increase of six years over a 10 year period). The average age of the entire fleet was 24 years in 2001 (table 6.19 below). The total number of vessels active in the fishery from 1992 to 2001 has fluctuated from 46 in 1992 to a low of 25 in 1998—the number of fishers employed in the fishery has also fluctuated in accordance with the number of active vessels.

Table 6.19: Structural characteristics of the inshore trawl fleet.

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Average length	22	21	21	21	21	21	21	23	22	22
Average age	22	23	24	22	20	20	23	22	21	24
Average GRT	107	80	70	74	72	75	71	147	151	135
Average Kwt	349	299	287	301	301	331	303	321	311	319
Vessels	46	41	37	35	31	30	25	32	32	30
Fishers	557	486	425	403	323	330	276	405	405	378

Data source: FIHB (1992 to 2002)

The important elements of the inshore trawl fleet are, first, the median and average vessel sizes have not changed significantly over the period 1992 to 2001, possibly indicating a stable fishery. Second, the vessels are becoming older, which Hecht and Bross (2002:67) point to the reluctance of companies to reinvest. This may be a result of the short term of quota share tenure and the increased risk associated with quota share redistribution. Alternatively, it could be a result of fishing companies buying older vessels from the subsidized European fleet and taking advantage of the quasi-rents associated with specific capital investments. Given that the age of the fleet seems to be an ongoing concern (chapter 2), the latter explanations are probably the main reason, but the other factors also must have some part to play. The next section deals with the change in access right ownership over the period discussed above.

6.11 ACCESS RIGHTS: THE INSHORE TRAWL FISHERY

The distribution of access rights in the form of vessel ownership in the fishery, as is previously stated and will continue to be stated, is an indication of the potential for fishers, other individuals, fishing companies and other companies to enter the fishery.

The number of new entrant companies, defined as companies that entered the fishery after 1993, that were successful[20] or unsuccessful is illustrated in table 6.20 below. An important result from table 6.20 is that the first successful new entrant fishing company holding access rights to the inshore trawl fishery only entered during 1997. However, by 2001 a full 50% of the fishing companies were new entrant companies.

[20] A successful new entrant fishing company is one that still existed in 2001.

Table 6.20: Companies holding access rights in the inshore fishery (1992 to 2001).

		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
NE (s)	Companies						1		1	2	1
	Vessels						1		1	5	2
	Fishers						12		61	48	22
NE (s) Cum	Companies						1		2	4	5
	Vessels						1		2	7	9
	Fishers						12		73	121	143
1994 Co	Companies	15	12	12	10	8	8	6	8	7	5
	Vessels	46	41	37	32	28	27	24	29	22	21
	Fishers	557	486	425	371	297	290	258	322	254	235
NE (u)	Companies				3	3	2	1	1	3	
	Vessels				3	3	2	1	1	3	
	Fishers				32	26	28	18	10	30	
Total	Companies	15	12	12	13	11	11	7	11	14	10
	Vessels	46	41	37	35	31	30	25	32	32	30
	Fishers	557	486	425	403	323	330	276	405	405	378
% NE (all)	Companies				23%	27%	27%	14%	27%	50%	50%
	Vessels				9%	10%	10%	4%	9%	31%	30%
	Fishers				8%	8%	12%	7%	20%	37%	38%

Data source: FIHB (1992 to 2002)
NE: new entrant, NE (s): successful new entrant, NE (s) Cum: cumulative new entrants,
NE (u): unsuccessful new entrant, NE (all) all new entrants, 1994 Co: companies that existed prior to and during 1994.

The five new entrant companies (50% of all companies) controlled 30% of all vessels and employed 36% of all fishers. The next section deals with the racial distribution of fishing skills.

6.12 SKILLS: THE INSHORE TRAWL FISHERY

As with the other fisheries a composite indicator is derived from survey data (Mather, et al, 2002) for the inshore trawl fishery and presented in table 6.21 below. The composite indicator is calculated as 27.9%, which is a result of a large income difference between Black fishers and White fishers. In particular, it is important to point out that the indicators only show the skills of fishers[21] and not those of shore-based, marketing or processing staff.

[21] Hecht and Bross (2002:44) point out that there is a 1:3 ratio of fishers to shore based employment in this fishery and in the deepsea trawl fishery.

Table 6.21: Indicators of the racial distribution of fishing skills in the inshore trawl fishery.

	Skilled fishers (full time)	
	Black	White
Average income[1]	R 41 876	R 150 000
% Black[2]	94.7%	
Adjusted % Black	100.0%	
Income differential	27.9%	
Composite indicator	27.9%	

[1&2]: Data source: Mather et al (2002)

Hecht and Bross (2002:52) assert that this fishery, and the deepsea hake fishery, emerged in a vertically integrated 'modern fishery' state in the early 1900s and that it would be unrealistic to separate out fishing activities from shore-based ones. It still, however, remains a fact that it is possible to separate fishing activities from shore-based ones, that access rights are exclusively fishing based and that quota shares are in essence individual rights to a primary economic activity, namely fishing.

6.13 QUOTA SHARE: THE INSHORE TRAWL FISHERY

Quota shares are distributed for both hake and sole, but as is mentioned in section 6.10, the sole (fish) quota holders in all years coincide with the hake quota holders. The entry and exit of quota holders for sole mirrors exactly the entry and exit of quota holders for hake. This is presented below on table 6.22.

Table 6.22: The distribution, entry and exit of inshore trawl quota holders (1989 to 2002).

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
		Quota Board					Interim Quota Board				MLRA			
Quota holders	14	12	10	11	11	10	11	11	11	11	11	13	13	12
1990 Quota holders	14	12	10	10	10	10	11	11	11	11	11	12	11	8
New quota holders				1	1							1	2	4
Entry														
New quota holders (s)												1	1	2
New quota holders (u)				1										
Exit														
1994 quota holders		-2											-1	-3
New quota holders						-1								

Data source: FIHB (1989 to 2002)

Table 6.22 shows that between 1989 and 2002, five new quota holders have entered and have been awarded a quota share. The four added under the quota share

distribution institutions of the Marine Living Resources Act successfully retained their quota share (not necessarily of the same asset size). The table also shows that although five quota holders entered between 1989 and 2002, seven quota holders exited during the same period. More light is thrown on this phenomenon below.

The number of quota holders is relatively small, thus the distribution of the TAC with the corresponding asset sizes is presented by quota holder name for sole in table 6.23 and for hake on table 6.24 below.

Table 6.23: Distribution of quota shares for inshore trawl (sole) by quota holder (1989 to 2002).

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
		Quota Board					Interim Quota Board				MLRA			
Pre-1991 quota holders														
Irvin & Johnson	94	91	95	95	95	95	95	95	95	95	95	95	95	86
Mariette Fishing	221	313	327	327	327	327	327	327	327	327	327	314	314	
Viking Inshore	114	110	201	201	201	201	201	201	201	201	201	194	194	168
Hermanus Sea Foods	90	86	90	90	90	90	90	90	90	90	90	90	90	86
G & T Fishing	25	24	25	25	25	25	25	25	25	25	25	25	25	29
Cronje P	51	49	51	51	51	51	51	51	51	51	51	51	51	44
Cronje Visserye	29	28	29	29	29	29	29	29	29	29	29	29		
Chetty S B	6	6	6	6	6	6	6	6	6	6	6	6	6	
Chetty's Fisheries	5	4	5	5	5	5	5	5	5	5	5	5	5	11
Oosthuizen B	14	13	14	14	14	14	14	14	14	14	14	14	14	15
B M C Visserye	29	28										10	10	18
Crous J I	86	83					29	29	29	29	29	29	29	
% TAC	88%	100%	100%	97%	97%	100%	100%	100%	100%	100%	100%	99%	95%	58%
Average asset size	64	70	84	84	84	84	79	79	79	79	79	72	76	57
New quota holders														
Seavuna														274.4
Vecto Trade 126												10	10	12.6
Capensis Investments														14.8
Cronje ML													29.4	26.7
% TAC												1%	5%	42%
Average asset size												10	10	82
Unsuccessful quota holders														
Le Roux C				29	29									
J & R Fishing	52													
Van Rensburg J L	52													
% TAC	12%			3%	3%									
Average asset size	52			29	29									

Data source: FIHB (1989 to 2002)

Table 6.24: Distribution of quota shares for inshore trawl (hake) by quota holder (1989 to 2002).

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
		Quota Board					Interim Quota Board				MLRA			
Pre-1991 quota holders														
Irvin & Johnson	4179	4089	4179	4179	4179	4179	4179	4179	4156	3937	3937	3780	4045	3570
Mariette Fishing	1663	2324	2375	2375	2375	2375	2375	2375	2362	2252	2252	2148	2298	
Viking Inshore	909	890	1279	1279	1279	1279	1279	1279	1272	1216	1216	1216	1301	1188
Hermanus Sea Foods	745	728	745	745	745	745	745	745	740	705	705	705	755	780
G & T Fishing	400	392	400	400	400	400	400	400	398	379	379	379	406	454
Cronje P	323	316	323	323	323	323	323	323	321	306	306	306	328	296
Cronje Visserye	158	155	158	158	158	158	158	158	157	150	150	150		
Chetty S B	95	93	95	95	95	95	95	95	95	90	90	90	96	
Chetty's Fisheries	95	93	95	95	95	95	95	95	209	199	199	199	213	274
Oosthuizen B	95	93	95	95	95	95	95	95	95	90	90	90	96	122
B M C Visserye	90	88										175	187	278
Crous J I	370	362					90	90	90	86	86	86	92	
% TAC	93%	100%	100%	99%	99%	100%	100%	100%	100%	100%	100%	98%	97%	72%
Average asset size	760	802	974	974	974	974	894	894	899	856	856	777	892	870
New quota holders														
Seavuna														2126
Vecto Trade 126												175	187	213
Capensis Investments														199
Cronje ML													161	165
Total %												2%	3%	28%
Average asset size												175	174	676
Unsuccessful quota holders														
Le Roux C				90	90									
J & R Fishing	292													
Van Rensburg J L	420													
% TAC	7%			1%	1%									
Average asset size	356			90	90									

Data source: FIHB (1989 to 2002)

Taking tables 6.23 and 6.24 together, the names of the quota holders do not change, but the ranking of the quota holding companies does. In other words, all the quota holders are allocated a hake/sole combination but not according to a standardized asset size ratio. A few observations on the new quota holders are necessary.

a Seavuna is a joint venture between Mariette Fishing (50% ownership) and Vuna Fishing (50% ownership and management). This is a joint venture empowerment company.

b Cronje P exited after 2000 and Cronje ML entered during the 2001 distribution round. Both Cronje P and Cronje ML have the same address, telephone number and fax (Warman, 2002:126).

c Chetty SB exited after the 2001 season, but Chetty's Fisheries benefitted by an asset size more or less proportional to the Chetty SB quota share.

These observations point out that the inshore fishery is more stable than the results from tables 6.23 and 6.24 indicate. It also makes clear that quota share redistribution only started to occur in 2002, and that the major part of the redistribution was privately instituted by means of a joint venture between the Mariette Fishing Company (a subsidiary of Sea Harvest) and the Vuna Fishing Company—the SeaVuna Fishing Company controls 22% of the inshore hake TAC and 35% of the sole TAC. Prior to this, 1% of the sole TAC and 2% of the hake TAC was redistributed to new quota holders during 2000 and 2001[22].

6.14 CONTROL: THE INSHORE TRAWL FISHERY

The corporate[23] control of the inshore trawl fishery is examined in terms of the control over the access rights (fishing capital) and the control over the TAC (resource rent).

6.14.1 Access Rights (Fishing Capital)

Table 6.25 below indicates that Irvin & Johnson control just over one quarter of the fishing capital and the access rights. The Viking Inshore fishing company controls about 20% of the access rights and the joint venture company SeaVuna just under 20% of the fishing capital in the inshore fishery.

Table 6.25: Control of access rights to the inshore trawl fishery by corporate companies (2000 & 2001).

	2000		2001	
	Vessels	Fishers	Vessels	Fishers
Irvin & Johnson				
%	25%	22%	27%	24%
Sea Harvest				
Sea Harvest	3%	6%		
Mariette Fishing	3%	3%		
Seavuna Fishing Co[1]	13%	9%	17%	13%
%	19%	18%	17%	13%
Viking Inshore				
%	19%	15%	23%	20%
All Consolidated Co				
%	63%	55%	67%	57%

Data source: FIHB (2000 to 2002)
[1]: 50% Sea harvest, 50% Vuna Fishing

[22] These percentages assume that Cronje P is the same company as Cronje ML.
[23] See appendix A3 for a derived structure of corporate subsidiaries and affiliates.

The three biggest corporate fishing companies operating in this fishery control about three quarters of the fishing capital.

6.14.2 Quota Shares (Resource Rent)

Because sole and hake quota shares are allocated together but, depending on the quota holder, in different asset size proportions, the corporate control over the hake TAC and the sole TAC is treated separately in tables 6.26 and 6.27 respectively.

The five corporate fishing companies (including the Lusitania Empowerment Companies) controlled 77% of the inshore hake TAC in 1999 and 72% in 2002. Irvin & Johnson itself controlled more than 40% of the TAC before 2002 (it dropped to 37% after the 2002 distribution round). The Mariette Fishing Company in a joint venture agreement with a black economic empowerment company Vuna Fishing, is called SeaVuna and still considered to be a corporate company as it controls 17% of the fishing capital in the inshore fishery, 22% of the inshore hake TAC and 35% of the sole TAC (see table 6.27).

Table 6.26: Control of inshore trawl (hake) quota shares by consolidated company (1989 to 2002).

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
		Quota Board					Interim Quota Board				MLRA			
Irvin & Johnson														
Irvin & Johnson	4179	4089	4179	4179	4179	4179	4179	4179	4156	3937	3937	3780	4045	3570
% of TAC	42%	42%	43%	42%	42%	43%	42%	42%	42%	42%	42%	40%	40%	37%
Sea Harvest														
Mariette Fishing	1663	2324	2375	2375	2375	2375	2375	2375	2362	2252	2252	2148	2298	
Seavuna														2126
% of TAC	17%	24%	24%	24%	24%	24%	24%	24%	24%	24%	24%	23%	23%	22%
Viking Inshore														
Viking Inshore	909	890	1279	1279	1279	1279	1279	1279	1272	1216	1216	1216	1301	1188
% of TAC	9%	9%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	12%
Pioneer Fishing														
G & T Fishing	400	392	400	400	400	400	400	400	398	379	379	379	406	454
% of TAC	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	5%
Lohe Galero Holdings (Lusitania)														
Lusitania Empowerment Company (LEC)														
Hermanus Sea Foods	745	728	745	745	745	745	745	745	740	705	705	705	755	780
% of TAC	8%	8%	8%	8%	8%	8%	8%	8%	7%	7%	7%	7%	7%	8%
Total														
% of TAC	71%	78%	79%	78%	78%	79%	78%	78%	77%	77%	77%	74%	74%	72%

Data source: FIHB (1989 to 2002)

Table 6.27: Control of inshore trawl (sole) quota shares by consolidated company (1989 to 2002).

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
		Quota Board					Interim Quota Board				MLRA			
Irvin & Johnson														
Irvin & Johnson	94	91	95	95	95	95	95	95	95	95	95	95	95	86
% of TAC	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%
Sea Harvest														
Mariette Fishing	221	313	327	327	327	327	327	327	327	327	327	314	314	
Seavuna														274
% of TAC	26%	37%	39%	37%	37%	39%	37%	37%	37%	37%	37%	36%	36%	35%
Viking Inshore														
Viking Inshore	114	110	201	201	201	201	201	201	201	201	201	194	194	168
% of TAC	13%	13%	24%	23%	23%	24%	23%	23%	23%	23%	23%	22%	22%	21%
Pioneer Fishing														
G & T Fishing	25	24	25	25	25	25	25	25	25	25	25	25	25	29
% of TAC	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	4%
Lohe Galero Holdings (Lusitania)														
Lusitania Empowerment Company (LEC)														
Hermanus Sea Foods	90	86	90	90	90	90	90	90	90	90	90	90	90	86
% of TAC	10%	10%	11%	10%	10%	11%	10%	10%	10%	10%	10%	10%	10%	11%
Total														
% of TAC	50%	62%	64%	62%	62%	64%	62%	62%	62%	62%	62%	60%	60%	61%

Data source: FIHB (1989 to 2002)

With regard to the sole TAC, SeaVuna controls 35%, Viking Inshore 21%, Irvin & Johnson and Hermanus Sea Foods (a Lusitania Empowerment Company) 11% each and Pioneer Fishing 4%, comprising a total of a 61% corporate control over the TAC. However, during 2002, the five corporate fishing companies controlled less of the sole TAC than the inshore hake TAC—61% and 72% respectively.

6.15 STRONG VS WEAK REDISTRIBUTION: THE INSHORE TRAWL FISHERY

This fishery is characterized by stability and private initiatives to redistribution. In terms of the three criteria for strong redistribution by 2002 the following had been achieved. First, 8.5% of the fishing capital has been redistributed through a black economic empowerment joint venture that controls 17% of the total capital. Second, the composite indicator of human skills shows 27.9% absorption of Black skilled fishers into the fishery. Third, less than 28% of the TAC is distributed to new quota holders. Although this fishery is stable (the number of access rights more or less equals the number of quota holders—figure 6.19) and there does not seem to be an impending or potential overcapacity problem, the record of redistribution to correct

for racial imbalances created during the apartheid era in South Africa does not seem impressive.

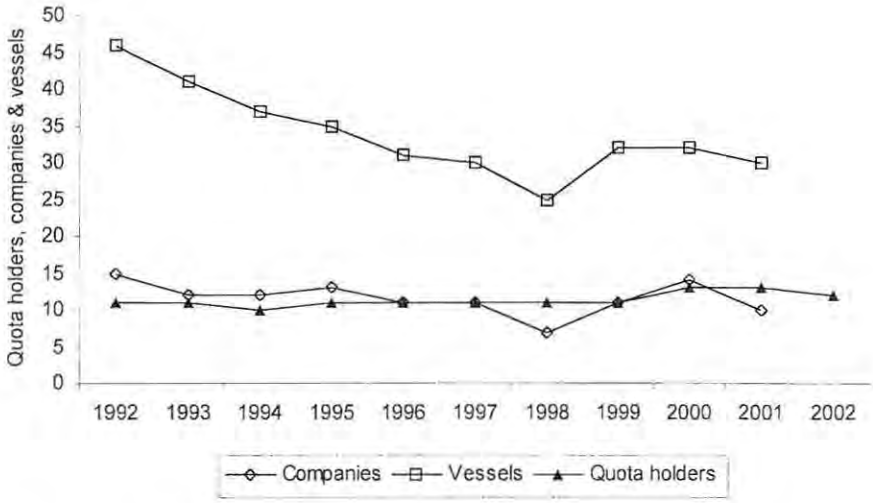

Figure 6.9: Vessels (access rights), companies (access rights holding companies) and quota holders in the inshore fishery (1992 to 2002).
Data source: FIHB (1992 to 2002)

Before the awarding of quota share to the SeaVuna Fishing Company during 2002, the state, however, had redistributed less than 3% of the inshore hake TAC and less than 5% of the sole TAC—both redistributions occurring under the Marine Living Resources Act of 1998. However, this is the one fishery where the proportion of redistributed fishing capital can be determined relatively accurately.

From a fisheries management efficiency point of view, if taken in isolation and because MCM obviously has not intervened by reallocating a portion of the TAC or by broadening the quota share base, almost no new information has been added to the system. However, as illustrated above, with 8.5% of fishing capital in Black economic empowerment hands, a composite indicator of human capital (skills) of 27.9% and a redistribution of the resource rent of 28% of the TAC (only 17.5%[24] can safely be attributed to a black economic empowerment group and that only in 2002), there is obviously no concerted effort expended by MCM at racial normalization in this fishery.

[24] ½ of 35% of the TAC controlled by SeaVuna joint venture between Sea Harvest and Vuna Fishing.

6.16 SUMMARY: MEDIUM VESSEL TAC FISHERIES

The broadening of the quota share base, in each of the medium vessel TAC fisheries covered in this chapter, was not all implemented under the same distribution institution.

a The largest change in the quota share base for the anchovy TAC occurred in 1998 during the transition between the Interim Quota Board and the institutions under the Marine Living Resource Act (figure 6.10 below).

b Large increases in the quota share base were instituted in the pilchard TAC in 1991 during the Quota Board period and during 1995, 1997 and 1998 under the Interim Quota Board (figure 6.11 below).

c For the bait TAC positive changes occurred in 1993, 1994 and 1995 during the transition between the Quota Board and Interim Quota Board times (figure 6.12).

d The inshore hake and sole TAC experienced a very moderate broadening of the quota share base in 1995 and in 2000 (figure 6.13).

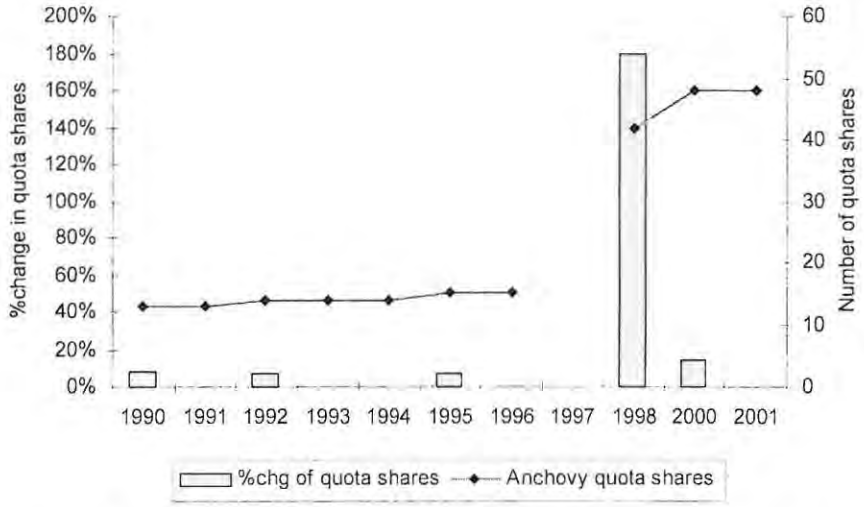

Figure 6.10: The broadening of the quota share base in the anchovy fishery (1990 to 2001).
Data source: FIHB (1990 to 2002)

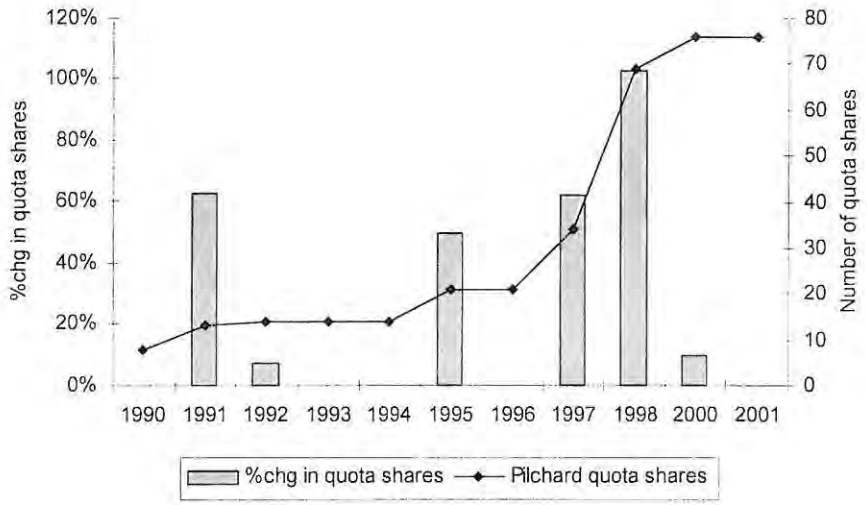

Figure 6.11: The broadening of the quota share base in the pilchard fishery (1990 to 2001).
Data source: FIHB (1990 to 2002)

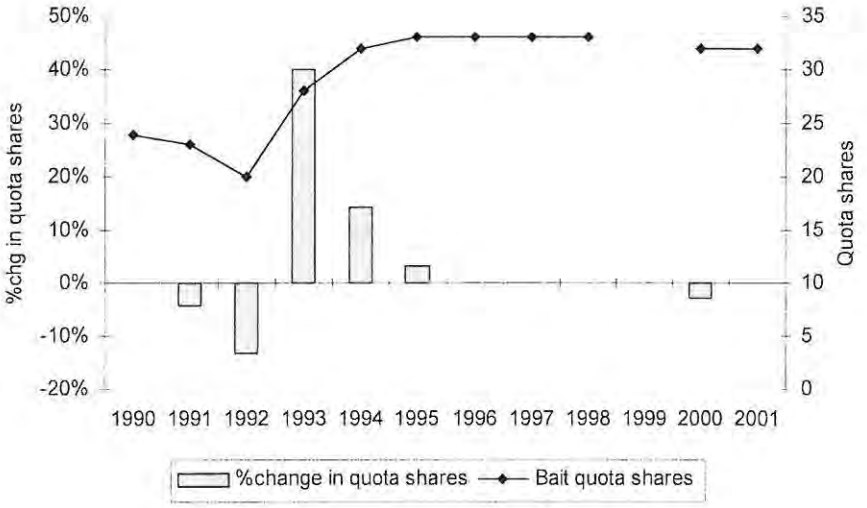

Figure 6.12: The broadening of the quota share base in the bait fishery (1990 to 2001).
Data source: FIHB (1990 to 2002)

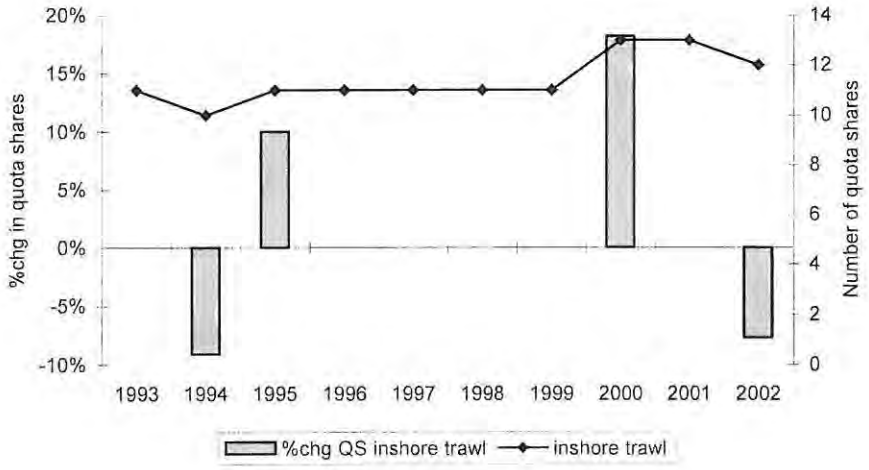

Figure 6.13: The broadening of the quota share base in the inshore trawl fishery (1993 to 2002).
Data source: FIHB (1990 to 2002)

A coordinated broadening of the quota share base in the medium vessel TAC fisheries is not apparent. Most of the redistribution, often coupled with the broadening of the quota share base, for the anchovy and pilchard TAC, was implemented during the Interim Quota Board time when most of the successful new quota holders were added. For the bait TAC, the redistribution and broadening of the quota share base happened during the Quota Board time. In essence, the inshore trawl sole and inshore hake fisheries did not experience either a broadening of the quota share base or a redistribution of the quota share. Redistribution in this fishery occurred privately with the merging of Mariette Fishing (a subsidiary of Sea Harvest) and Vuna Fishing for the 2002 quota share distribution round.

The indicators of redistribution in the medium vessel fisheries should point to the extent, or at least the possible extent, to which fishing capital, skills and resource rent are distributed between new economic agents in the fisheries and old economic agents. The racial distribution of access rights and quota shares is difficult to measure without the true racial composition of the ownership of fishing companies. Table 6.28, below, provides a comparison of access rights and skills indicators of possible redistribution and table 6.29 gives the distribution of the TAC between old and new quota holders.

Table 6.28: Access rights and skills for medium vessel TAC fisheries (2001).

		Pelagic Fishery		Inshore Trawl Fishery
		Anchovy & Pilchard	Bait	
Fleet characteristics	Average length	25m	23m	22m
	Average age	23 years	23 years	24 years
	Vessels	45 vessels	36 vessels	30 vessels
	Fishers	475 fishers	523 fishers	378 fishers
Access rights % New entrants	Companies	46%	64%	50%
	Vessels	36%	50%	30%
	Fishers	39%	39%	38%
	Fishing Power	38%	53%	
Skills[1]	Full-time	33.3%		27.9%
	Part-time	48.7%		

[1]: Composite index

The number of new entrants (measured as the change in ownership of vessels) into both the pelagic and inshore trawl fisheries is 50% and below. The absorption of skilled fishers into both the pelagic and inshore trawl fisheries is, however, lower and would be the binding constraint on strong redistribution in both fisheries.

Table 6.29: Quota shares, average asset sizes and percentage of the TAC of new quota holders (2001 Pelagic, 2002 Inshore Trawl).

		Pelagic			Inshore Trawl	
		Anchovy	Pilchard	Bait	Hake	Sole
New Quota Holders	% of Quota Shares	81%	91%	34%	36%	36%
	% of TAC	66%	59%	35%	28%	42%
Average Asset sizes	% of TAC (Old)	3.7%	5.9%	3.1%	9.0%	7.3%
	% of TAC (New)	1.7%	0.8%	3.2%	1.7%	10.5%
New quota holder asset size[1]		46%	14%	103%	19%	144%

[1]: The proportionate size of the average asset size of new quota holders in relation to the average asset size of old quota holders

The distribution of the resource rent to new quota holders does not, except in the case of pelagic bait, create binding constraints on strong redistribution—rather, strong redistribution is bound by skills and fishing capital. In the case of the pelagic bait TAC, only 35% has been redistributed to new quota holders, who hold larger assets sizes on average than the old quota holders, but 50% of the access rights (fishing vessels) have changed hands in the same period. In the inshore trawl fishery, more of the sole has been redistributed than the hake and the average asset size for new sole quota holders is larger than that for old quota holders (this is a result of the Sea Harvest Vuna fishing merger).

The corporate control of the medium vessel sized TAC fisheries is presented in tables 6.30 and 6.31 below. Corporate control over the vessels licensed to harvest pilchard and anchovy and those licensed to exploit the inshore hake and sole resource is relatively high, 62% and 67% respectively.

Table 6.30: Corporate control over the access rights in the medium vessel TAC fisheries (2001).

	Percentage of vessels in the fleet		
	Anchovy & Pilchard	Bait	Inshore Trawl
Irvin & Johnson			27%
Viking Inshore			23%
Sea Harvest (SeaVuna)	2%		17%
Oceana	27%	22%	
Saldahna	13%		
Premier	11%	3%	
Foodcorp	9%	11%	
Total	62%[I]	36%[II]	67%

[I]: fishing power 69%, [II]: fishing power 53%

When taking into consideration the fishing power of the pelagic fleet, the corporate fishing companies control 69% and 53% of the anchovy and pilchard, and the bait fishing capital respectively.

Table 6.31: Corporate control over the TAC of the pelagic and inshore medium vessel fisheries (2002).

	Pelagic			Inshore Trawl	
	Anchovy	Pilchard	Bait	Hake	Sole
Irvin&Johnson				37%	11%
Sea Harvest[1]				22%	35%
Viking Inshore				12%	21%
Pioneer		3%	5%	5%	4%
LGH			7%	8%	11%
Oceana	12%	14%	11%		
Saldanha	10%	8%	4%		
Premier	8%	8%	11%		
Foodcorp	6%	13%	2%		
Total	35%	43%	40%	72%	61%

[1]: Includes SeaVuna

Table 6.31 illustrates that by 2002 the corporate control over the TAC in the pelagic fishery ranged between 35% and 43%. The corporate control of the TAC in the inshore trawl fishery, particularly the hake TAC, remained high at an eventual 72%.

6.17 THE HAKE LONG-LINE FISHERY

The hake long-line fishery was introduced as an experimental fishery during 1994, but only became functional as a fully-fledged commercial fishery during 2000 (Hecht & Bross, 2002:104). As a result, the hake long-line fleet has not been firmly established, although the tuna fishery (who were the targeted group to undertake the experimental fishery) had included long-line gear into their multi-species vessels. Those vessels that have been active in this fishery are, however, usually medium-sized vessels (see appendix A8 for a fleet structure). The hake long-line is divided into inshore and offshore components. The inshore hake long-line fishery is limited to deploying no more than 4 000 hooks per day. The offshore hake long-line fishery has no hook limitation, but fishing is only allowed at depths greater than 110m.

Because the long-line fleet had not developed into a 'mature' fishery with entrenched interests, the distribution of the resource rents as quota share could be used as a powerful instrument in non-corporate black economic empowerment. In fact, as is stated in chapter 2, under the policy guidelines "...the hake long-line fishery is one of the fisheries targeted as vehicles to promote small black economic empowerment enterprises, but will not exceed 10% of the hake TAC" (RSA, 2001d:3). Table 6.32 gives an illustration of the expanding quota share base in this fishery.

Table 6.32: Entry and exit of hake long-line quota holders (2000 to 2002).

	2000	2001	2002
Quota holders	43	43	115
2000 quota holders	43	43	37
New quota holders			78
Entry			
New quota holders (s)			78
New quota holders (u)			
Exit			
2000 quota holders			6
New quota holders			

(s): successful quota holders, (u): unsuccessful quota holders
Data source: FIHB (2000 to 2002)

For the medium term quota share distribution round, 78 supposedly small black economic empowerment fishing companies were added to the quota share base and six previous quota holders removed. However, only 10% of the entire hake TAC, or

just under 10 000 tons, was allocated to the hake long-line fishery. Bearing in mind that the largest quota holder, Irvin & Johnson, was awarded just over 45 000 tons (see chapter 7) in the same period. In addition, chapter 2 also points out that small black economic empowerment companies paid up to 700 times more per ton on their application fee than the largest corporate hake quota holding company. Table 6.33 illustrates the asset sizes awarded to quota holders in this fishery.

Table 6.33: Asset sizes for hake long-line quota holders (2000 to 2002).

	2000	2001	2002
Number of quota holders	44	44	116
Average asset size	122	132	85
Median asset size	100	108	65
Highest asset size	800	867	800
Lowest asset size	100	108	65

Data source: FIHB (2000 to 2002)

Table 6.33 illustrates that the smallest asset size fell between 2000 and 2002 from 100 tons to 65 tons, which furthermore is identical to the median asset size indicating that the smallest asset size is the rule and the larger asset sizes are the exception. The largest asset size of 800 tons in 2002 was awarded to the Tuna Hake Fishing Corporation (Warman, 2002:19), to be shared out between the tuna fishing companies that participated in the hake long-line experimental fishery before it became a commercial one. Furthermore, Kaye (2001, pers comms) estimates that a minimum viable asset size between 500 and 600 tons is required to operate a long-line vessel successfully.

Assuming that MCM was aware of this minimum asset size when it made its announcement that the hake long-line fishery was earmarked for small black economic empowerment initiatives, then i) by awarding a median asset size of 65 tons and ii) imposing an application fee of up to 700 times per ton greater than that paid by large corporate companies its intentions and beliefs must be:

a Black economic empowerment fishing companies are very much more efficient than the corporate ones. They can absorb the transaction costs, at for example a modest 10%, by bringing together between eight and ten companies to make one viable fishing company.

b Or, that it wants to discourage small black economic empowerment in all fisheries.

An alternative view is that the policy put forward by MCM is simply naïve. Also, adding 115 new quota holders in the hake long-line fishery from 2000 to 2002 creates the possibility for 115 new medium sized fishing vessels to enter the fishery. The list of quota holders is provided in appendix A8, many of whom hold, and have held, quota shares in the pelagic, squid and other fisheries from before 1994. The possibilities for strong redistribution in this fishery are accordingly not good.

6.18 CONCLUSION

What is clear in the medium vessel TAC fisheries is that each fishery faces different issues in the design of the environmental parameters and that each has experienced different redistribution strategies.

a For the pilchard and anchovy part of the pelagic fishery, the quota share base increased most rapidly between 1996 and 1998 (the latter half of the Interim Quota Board time). It is also during this time that the number of quota shares in both anchovy and pilchard exceeded the number of access right holding companies. By 2001, the number of anchovy quota shares just exceeded the number of vessels active in the fishery, but the number of pilchard shares exceeded both the number of vessels and the number of pilchard quota shares. The distribution strategy must therefore be aimed at encouraging new quota holders to lease their quota share or to build new vessels. Alternatively, there exists a potential over-capacity problem if all new quota holders 'invest' in the fishery and acquire new vessels (since 1997 the number of quota holders exceeded the number of active vessels). Corporate control is high.

b In the bait part of the pelagic fishery the number of quota shares increased during the Quota Board time and remained stable thereafter. Of the 32 pilchard bait quota shares distributed during 2001, 35% of the TAC went to 11 new quota holders (those that were allocated quota shares after 1993). The number of quota holders has remained more or less consistent with the number of active vessels. Corporate control is high.

c In the inshore hake and sole fishery MCM obviously has not intervened by reallocating a portion of the TAC or by broadening the quota share base.

However, 8.5% of fishing capital is in black economic empowerment hands. The composite indicator of human capital (skills) is measured at 27.9%, but only 17.5% of the TAC can safely be attributed to a black economic empowerment group and that only in 2002. This fishery is obviously not targeted by MCM as a black economic empowerment one. Corporations and private black economic empowerment initiatives dominate in this fishery.

d Finally, where MCM does target a fishery for small black economic empowerment concerns, it has placed some very severe obstacles and biases that work directly against its stated objectives.

From a strong redistribution point of view MCM's intervention instrument, redistributing the resource rent, is not sufficient. It is difficult to know the racial distribution of the fishing companies to whom quota shares have been awarded. The fishing skills are usually not sufficiently high for a realistic transfer of fishing capital and no development activity is undertaken by MCM in these fisheries other than redistributing part of the TAC.

When examining the informational costs of implementing and enforcing the fisheries management plans, i) in the pelagic fishery the quota share holding base increased during the Quota Board and Interim Quota Board times, so since 1998 the informational requirements have not increased, ii) since 1990 the informational requirements to run the inshore hake and sole fishery have not changed, and iii) the introduction of 115 new quota holders in the hake long-line fishery, under the Marine Living Resources Act, substantially increases the informational requirements and informational costs of MCM as well as the transaction costs of the private fishing companies. It also brings into question the fishing-capacity management ability of MCM.

CHAPTER SEVEN
LARGE VESSEL TAC FISHERIES

7.1 INTRODUCTION

The South African large vessel TAC fisheries covered in this chapter are the deepsea hake trawl fishery and the south coast rock lobster fishery. The large vessel fisheries are defined in this thesis as those fisheries that use vessels longer than 35m. The deepsea hake fishery was in the past subject to heavy over-exploitation by foreign fleets. However, since 1977 when South Africa's EEZ was internationally recognized, unauthorized fishing vessels could more easily be policed and severely punished. No subsistence or recreational fisheries exist for either the deepsea hake trawl fishery or the south coast rock lobster fishery.

The structure of the chapter is similar to that used for the micro to small vessel fisheries and the medium vessel fisheries[1]. The standard structure for describing the fisheries used in this thesis is: i) an overview of the fishery where important details are provided that are not included in the standardized format, ii) the structure of the fishing fleet, iii) the distribution of access rights, iv) the skills distribution, v) the quota share distribution, vi) the control of access rights and quota shares and vii) a discussion on strong versus weak redistribution. Again, where appropriate the various distributions are described in terms of the three institutions that have distributed quota share since 1990, namely, the Quota Board, the Interim Quota Board and under the Marine Living Resource Act of 1998.

The chapter concludes with a comparison of the distribution and redistribution trends with regard to the two large vessel TAC fisheries discussed in this chapter. The policy options are discussed along with the micro to small vessel and medium vessel fisheries in the following chapter.

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[1] Similar tables and figures are used as with the other fisheries covered up until this point. Tables and figures not presented in the chapter, but used as standard tables and figures in other fisheries, are placed into the appendices.

7.2 OVERVIEW: DEEPSEA HAKE TRAWL FISHERY

What distinguishes the hake fisheries is the application of a global TAC which is divided between the various hake fisheries, namely, deepsea hake trawl, inshore trawl, hake long-line and hake hand-line. The global TAC is shared between the following fisheries that are bound by different rules:

a Operators in the deepsea hake trawl fishery are bound to fish at depths greater than 110m.

b The inshore trawl fishery (section 6.2) is limited to the Agulhas bank and to fish at depths less than 110m.

c The hake long-line is divided into inshore and offshore components. The inshore hake long-line fishery is limited, deploying no more than 4 000 hooks per day. The offshore hake long-line fishery has no hook limitation, but fishing is only allowed at depths greater than 110m.

d A certain portion of the global TAC is set aside[2] for the hand-line hake fishery.

Although there is some conflict in the division of the global TAC, particularly with regard to the long-lining share[3], the deepsea hake trawl fishery has retained a relatively large percentage of the global TAC. This is illustrated in figure 7.1 below.

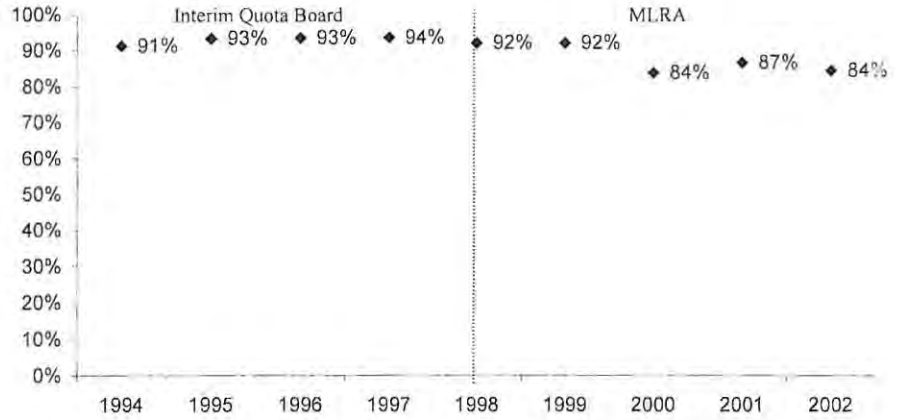

Figure 7.1: The proportion of the global hake TAC that goes to deepsea hake trawling (1994 to 2002).
Source: FIHB (1994 to 2002)

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[2] This amount is set aside for the purposes of calculating a TAC and is not allocated as quota shares.
[3] The Western Cape Long-line Forum, for example, wants an increase from about 6% to 25% of the global TAC (RSA: 2001g).

Hecht and Bross (2002:57) assert that, since 1983, the split of the global TAC between deepsea and inshore hake fisheries has been fixed at approximately 92.5 to 7.5. However, figure 7.1 illustrates that the proportion of the global TAC allocated to the deepsea hake trawl fishery after 1994 varied between 94% and 84%. They (2002:57) interpret the rise in the proportion of the global TAC during the Interim Quota Board time as a result of a fall in foreign allocations[4].

The fall in the deepsea slice of the global TAC during 1998 and 1999 has been attributed to the allocation of a TAC for the new commercial hake long-line fishery and the setting aside of a small proportion of the global TAC for the hake hand-line fishery (both established during 1998). The fluctuation between 2000 and 2002 is a result of a variable TAC for the hake long-line and hake hand-line fisheries. With a full TAC for the hake long-line[5] and hake hand-line, the evidence from 2000 and 2002 (Warman, 2001 and Warman, 2002) indicates that the global TAC split between the deepsea, inshore, long-line and hand-line fisheries is 84:6:6:4 respectively.

The hake trawl fisheries are undoubtedly the most valuable of all the fisheries in South Africa, with annual sales of over R1.5billion and R0.7billion in foreign exchange (in 2000 rand and US$ values) (Hecht and Bross, 2002:43). A significant portion of the sales value, however, is generated in the processing and packaging of the fish products. The South African Deep Sea Trawling Industry Association represents the vessels owners in the deepsea hake trawl fishery.

7.3 THE STRUCTURE OF THE FISHING FLEET: DEEPSEA HAKE TRAWL FISHERY

Although this fishery consists of a number of vessels with different characteristics, for example, vessels that use ice to keep their catch fresh (wet-fish vessels), vessels that blast-freeze their catch (freezer vessels) and factory vessels that process the catch at sea, over 90% fall into the large vessel category and are not usually multi-purpose vessels. The characteristics of the deepsea hake trawl fleet are presented in appendix

[4] Foreign allocations were made "usually as a *quid pro quo* for favours during isolation" (Hecht and Bross, 2002:57).
[5] The entire TAC for hake long-line was not allocated during 2000.

A9. Briefly, however, the average length of a deepsea hake trawl vessel has ranged between 48m and 53m, the average age of the vessels is increasing and the average number of vessels and fishers employed in this fishery between 1992 and 2001 is 37 vessels and 1998 fishers. The structure of the fleet, excluding the medium vessel outliers (the full structure is in appendix A9), is presented in table 7.1 below.

Table 7.1: The structure of the deepsea hake trawl fishing fleet (vessel numbers bold and median size highlighted) between 1992 and 2001.

		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
>35 to 40 (large)	Length	37	38	38	38	37	37	35	37	37	37
	Average age	9	16	18	12	13	14	13	18	19	20
	Average GRT	470	395	411	438	449	431	563	410	418	418
	Average Kwt	923	907	876	967	992	1020	1104	976	978	978
	Vessels	**3**	**5**	**6**	**4**	**13**	**10**	**2**	**10**	**11**	**11**
	Fishers	68	123	137	126	332	225	48	218	246	246
	Average fishers	23	25	23	32	26	23	24	22	22	22
>40 to 50 (large)	Length	45	44	44	44	45	44	44	44	44	44
	Average age	17	19	21	22	22	23	23	24	25	27
	Average GRT	546	519	521	556	557	547	557	560	551	545
	Average Kwt	1105	1085	1080	1099	1111	1115	1130	1150	1157	1169
	Vessels	**23**	**25**	**25**	**23**	**25**	**22**	**15**	**26**	**27**	**25**
	Fishers	642	649	651	625	669	613	381	712	735	648
	Average fishers	28	26	26	27	27	28	25	27	27	26
>50 to 60 (large)	Length	57	58	55	56	56	55	55	56	55	56
	Average age	30	25	23	20	18	14	17	11	17	18
	Average GRT	695	912	848	837	1054	1136	1067	1357	1069	1211
	Average Kwt	1258	1370	1391	1368	1551	1608	1594	1744	1550	1702
	Vessels	**4**	**4**	**3**	**4**	**5**	**4**	**3**	**3**	**5**	**6**
	Fishers	125	137	97	147	203	178	136	150	225	281
	Average fishers	31	34	32	37	41	45	45	50	45	47
>60 to 70 (large)	Length	62	63	63	61	62	62	61	62	62	62
	Average age	21	22	23	25	24	25	27	27	28	29
	Average GRT	887	916	905	808	879	879	806	879	879	879
	Average Kwt	1502	1603	1555	1457	1480	1480	1430	1480	1480	1480
	Vessels	**13**	**15**	**13**	**8**	**10**	**10**	**10**	**10**	**10**	**10**
	Fishers	660	773	684	408	511	511	495	511	511	511
	Average fishers	51	52	53	51	51	51	50	51	51	51
>70 (large)	Length	78	81	86	81	81	81	80	81	82	82
	Average age	20	16	15	19	20	21	21	27	27	26
	Average GRT	1642	1704	1968	1827	1827	1827	1845	1860	1962	2058
	Average Kwt	1645	1992	2125	2130	2130	2130	2177	2254	2345	2503
	Vessels	**2**	**6**	**5**	**8**	**8**	**8**	**7**	**6**	**5**	**4**
	Fishers	120	376	372	563	554	554	500	430	378	308
	Average fishers	60	63	74	70	69	69	71	72	76	77

Data source: FIHB (1992 to 2002)

The structure of the fleet has a bimodal distribution, with the dominant mode coinciding with the median size vessel at >40m to 50m and the second mode at >60m to 70m. This distribution does not reflect a size difference in freezer or wet-fish vessels, rather it is probably a result of the different size vessels favoured by two of the largest deepsea fishing companies (Sea Harvest deepsea fishing vessels average 44m and Irvin & Johnson's 62m).

7.4 DISTRIBUTION OF ACCESS RIGHTS: DEEPSEA HAKE TRAWL FISHERY

The distribution of access rights (or vessels) in the deepsea fishery is again an indication of the potential for strong redistribution, namely the redistribution of fishing capital. The entry and exit of companies that have owned or leased vessels from 1992 to 2001 is presented in table 7.2 below.

Table 7.2: Companies holding access rights in the deepsea hake trawl fishery (1992 to 2001).

		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Successful new entrant companies	Companies				1	1	1		1	2	1
	Vessels				2	3	1		1	2	1
	Fishers				100	59	50		30	40	32
	% Kwt				5%	2%	2%		1%	1%	1%
Successful new entrant companies (cumulative)	Companies				1	2	3	2	4	6	7
	Vessels				2	5	4	2	5	8	9
	Fishers				100	159	147	100	177	262	304
	% Kwt				5%	6%	6%	6%	8%	10%	12%
1994-companies	Companies	4	11	10	10	11	8	6	7	8	8
	Vessels	45	56	52	42	55	49	36	50	52	51
	Fishers	1615	2070	1941	1528	1945	1877	1474	1817	1832	1781
	% Kwt	100%	100%	100%	81%	83%	90%	91%	89%	87%	88%
Unsuccessful new entrant companies	Companies				4	4	4	1	3	2	
	Vessels				5	5	4	1	3	2	
	Fishers				269	243	123	36	98	82	
	% Kwt				14%	11%	4%	2%	3%	3%	
Total companies	Companies	4	11	10	15	17	15	9	14	16	15
	Vessels	45	56	52	49	65	57	39	58	62	60
	Fishers	1615	2070	1941	1897	2347	2147	1610	2092	2176	2085
% all new entrants	Companies				33%	35%	47%	33%	50%	50%	47%
	Vessels				14%	15%	14%	8%	14%	16%	15%
	Fishers				19%	17%	13%	8%	13%	16%	15%
	% Kwt				19%	17%	10%	9%	11%	13%	12%

Data source: FIHB (1992 to 2002)

Since 1994 seven successful new entrant companies (47% of the total number of companies) have accumulated nine deepsea hake trawl vessels (15% of all vessels with a total of 12% of the fleet's fishing power measured in kilowatts). Depending on what measure is used and in terms of the potential for redistributing fishing capital, the upper bound could be set at 47% if companies are used, 15% if vessels are used or 12% if fishing power is used. The companies' proportion would give a false picture because, as is demonstrated in section 8.7, there is a fairly large incidence of corporate control in this fishery. The number of vessels represents the total number of access rights, but the fishing power provides a more accurate picture of the value of the access rights. For example, a vessel with low fishing power is unlikely to harvest as many fish as one with larger engines. It makes sense to then set the upper limit on strong redistribution, based on the potential to redistribute fishing capital (access rights) and measured by fishing power at 12%.

7.5 SKILLS DISTRIBUTION: DEEPSEA HAKE TRAWL FISHERY

Data on income and race by skills group collected during the Economic and Sectoral Study (Mather et al, 2002) is used to calculate a composite indicator to represent the racial distribution of skills in the deepsea hake trawl fishery. Because large vessels are used, the captain and navigator are professional staff; a professional category is included along with the skilled fisher category. Data for the professional staff are sourced from Hecht and Bross (2002:77) and for skilled fishers from Mather et al (2002). The results are presented in table 7.3 below.

Table 7.3: Indicators of the racial distribution of skills in the deepsea hake trawl fishery.

	Professional[i]		Skilled fishers[ii]	
	Black	White	Black	White
Average income	R141 005	R219 172	R 107 241	R 181 297
% Black	89.6%		90.4%	
Adjusted % Black	100%		100%	
Income differential	64.3%		59.2%	
Composite indicator	64.3%		59.2%	

[i]: data source on average income and %Black, Hecht and Bross (2002),
[ii]: data source on average income and %Black, Mather et al (2002)

The composite indicator for the racial distribution of professional skills is higher than that for skilled fishers simply because the income difference between Black professionals and White professionals is lower than that for the skilled fisher group. The high value for both professional and skilled fisher groups is most likely a result of the human resource development practice and a high incidence of permanent jobs with the larger fishing companies. Also, being a fishery necessarily characterized by large companies, the Employment Equity Act has full effect; this must contribute positively to closing the skills gap in the deepsea hake trawl fishery.

7.6 QUOTA SHARE: DEEPSEA HAKE TRAWL FISHERY

The distribution and redistribution (and broadening of the quota holding base) of deepsea hake trawl quota shares is illustrated below. The number of quota holders in figure 7.2 is divided into pre-1995 quota holders, those that held a quota share before 1995, and new quota holders, basically those that were awarded quota during the Interim Quota Board or under the Marine Living Resources Act of 1998.

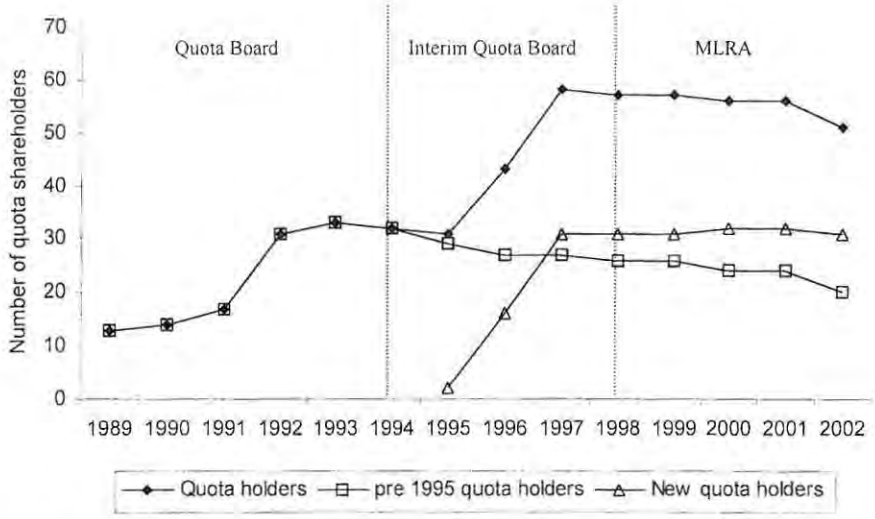

Figure 7.2: The distribution of quota shares between new quota holders and pre-1995 quota holders.
Data source: FIHB (1989 to 2002)

Figure 7.2 shows that the quota holding base was increased during the Quota Board and the Interim Quota Board time, but decreased under the Marine Living Resources Act. Most new quota holders were added during the Interim Quota Board period, but

new quota holders were also added under the Marine Living Resources Act. The entry and exit of quota holders under the three quota share distribution institutions, separated into pre-1995 quota holders and new quota holders, is presented in table 7.4 below.

Table 7.4: The distribution between pre 1995 quota holders and new quota holders and the entry and exit of these quota holders in the deepsea hake trawl fishery (1989 to 2002).

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
		Quota Board					Interim Quota Board				MLRA			
Quota holders	13	14	17	31	33	32	31	43	58	57	57	56	56	51
Pre-1995 quota holders	13	14	17	31	33	32	29	27	27	26	26	24	24	20
New quota holders							2	16	31	31	31	32	32	31
Entry after 1994														
Pre-1995 quota holders		1	3	14	2									
New quota holders (s)								11	14			5		1
New quota holders (u)							2	3	1					
Exit														
Pre-1995 quota holders						-1	-3	-2		-1		-2		-4
New quota holders												-4		-2

Data source: FIHB (1989 to 2002)

Under the Quota Board, 20 additional quota holders increased the pre-1995 quota-holding base from 13 in 1989 to 33 in 1993. The exit of one quota holder in 1994 established the pre-1995 quota-holding base at 32 quota shares of different asset sizes. The Interim Quota Board removed six quota holders from the pre-1995 base, added 31 new quota holders, 25 of whom were successful in retaining their quota share until 2002, and increased the quota holding base to 57 quota holders. Six more pre-1995 quota holders and another six quota holders from the Interim Quota Board lost their quota share. Six new quota holders selected under the institutional framework of the Marine Living Resources Act replaced 12 existing quota holders, six from the Quota Board and six from the Interim Quota Board. The final result in 2002 was a reduction of the quota-holding base from 57 quota shares to 51 quota shares and new quota holders held 61% of the quota shares.

This, however, is not the complete story. The size of the TAC controlled by the new quota holders provides a more complete picture of the redistribution efforts under the various distribution institutions. Figure 7.3 provides an illustration of the division of the TAC between old (pre-1995 quota holders) and new quota holders.

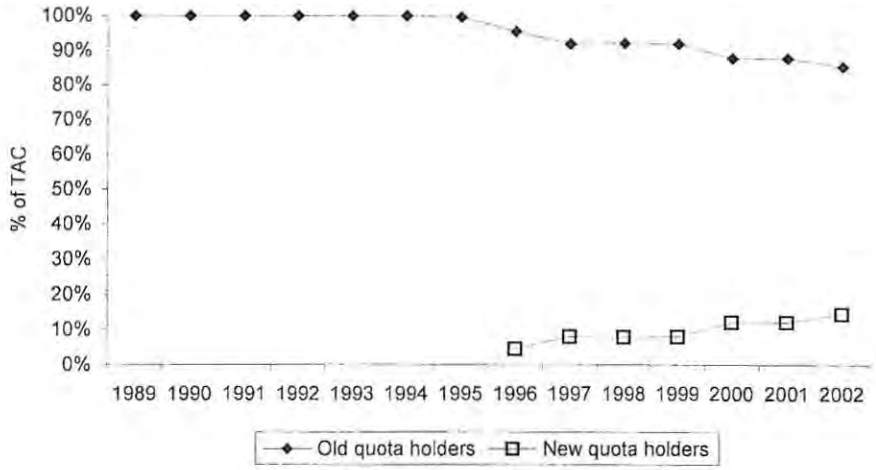

Figure 7.3: The distribution between old and new quota holders in the deepsea hake trawl fishery (1989 to 2002).
Data source: FIHB (1989 to 2002)

Although new quota holders held 61% of the quota shares by 2002, they controlled only 14% of the TAC. This points to an unequal asset size distribution among the quota holders. Table 7.5, below, provides the characteristics of the assets sizes from 1989 to 2002.

Table 7.5: The characteristics of the deepsea hake trawl fishery asset sizes in 100-ton units (1989 to 2002).

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
		Quota Board					Interim Quota Board				MLRA			
Average	93	87	73	41	40	43	42	32	24	23		23	25	27
Std dev	174	169	155	119	115	117	119	102	88	84		75	80	79
Highest	534	534	534	534	534	534	534	534	531	506		446	477	454
Lowest	3.0	2.0	1.0	0.5	0.7	0.7	0.7	0.7	1.0	0.9		2.6	2.7	3.4
Diff high & low	531	532	533	533	533	533	533	533	530	506		443	474	451
Quota holders	13	14	17	31	33	32	31	43	58	57	57	56	56	51

Data source: FIHB (1989 to 2002)

The first observation from table 7.5 is that the difference between the highest and lowest asset sizes held by the quota holders did not substantially change until the Marine Living Resources Act. The narrowing of the gap between the maximum and the minimum asset sizes is a first step to redistribution; however, the fact still remains that the variation of the asset sizes in each year is still large. The control over the TAC by corporate fishing companies is discussed next.

7.7 CONTROL: DEEPSEA HAKE TRAWL FISHERY

This section focuses on corporate control of fishing capital (access rights) and the resource rent (quota shares) in the deepsea hake trawl fishery. The corporate structures, their associates and subsidiaries are derived for 2002 and presented in appendix A3.

7.7.1 Access Rights (Fishing Capital)

A table showing the owners, or lessees, of the fishing vessels active in the deepsea hake trawl fishery, that is those with access rights to the fishery, is presented for the years from 1992 to 2001 in appendix A9. Table 7.6 below provides an indication of the corporate control over fishing capital during the year 2001.

Table 7.6: Control of access rights (fishing capital) in the deepsea hake trawl fishery 2001.

	2001		
	Vessels	Fishers	% GRT
Irvin and Johnson			
I&J	19	894	44%
Sea Harvest			
Sea Harvest	16	502	27%
Atlantic Trawling	2	48	2%
Total	18	550	29%
Oceana			
Blue Continent Products	2	75	3%
Viking Fishing			
Viking Fishing	8	165	7%
Foodcorp			
Foodcorp	3	110	5%
Premier Fishing			
Altantic Enterprise Fishing	1	10	0.4%
All consolidated companies			
Total %	85%	87%	89%
Lusitania Joint Ventures (LJV)			
MFV Emile Adriene Vessel Co	1	32	1%
MFV Augusta I Vessel Co	1	26	0%
Total	3%	3%	2%

Data source: FIHB

Table 7.6, which includes with each company their subsidiaries as well as their associates, indicates that during 2001 corporate fishing companies controlled at least

89% of the fishing capital, if measured by gross registered tonnage (GRT). These six companies controlled 78% of all vessels active in the fishery during 2001 and employed 85% of the fishers during the same year. The two top companies, Irvin and Johnson and Sea Harvest, controlled 73% of the fishing capital measured as a percentage of GRT, 62% of the vessels and employed 69% of the fishers.

7.7.2 Quota Shares (Resource Rent)

The resource rent, in the form of quota shares as a proportion of the TAC[6], has been and still is the major redistribution instrument of the fishing authorities. Figure 7.4 below illustrates the high level of control of the resource rent by corporate fishing companies. The corporate control over the TAC has, however, fallen from 97% of the TAC during 1989 to 80% of the TAC in 2002. Corporate control fell by 12% during the Quota Board, by 1% under the Interim Quota Board and by 7% under the institutions of the Marine Living Resources Act.

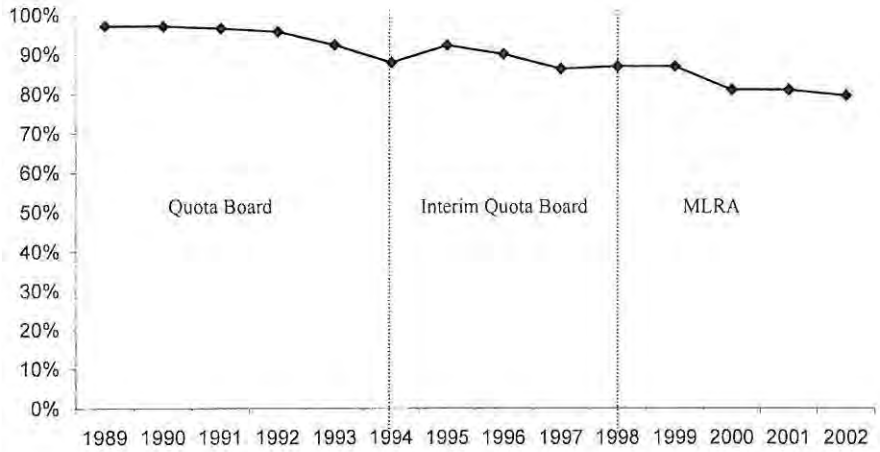

Figure 7.4: Corporate control of the TAC of the deepsea hake trawl fishery (1989 to 2002).
Data source: FIHB (1989 to 2002)

Table 7.7 below shows the control of the resource rent as a proportion of the TAC held as quota shares by the various corporate fishing companies[7].

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[6] This does not state that the quota shares remain a fixed proportion of the TAC on a year-to-year basis; rather a quota share is always a proportion of the TAC for the term for which it is awarded.

[7] Because company ownership, as a parent company or a subsidiary or an associate, is freely tradable along with its quota share, the consolidated companies shown on table 7.7 may not be accurate for all years. Also, because they are based on a derived ownership structure, the make up of the corporate fishing companies might be inaccurate.

Table 7.7: Corporate control of the resource rent as a percentage of the TAC.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
	Quota Board					Interim Quota Board				MLRA			
Irvin & Johnson													
Irvin & Johnson	44%	43%	42%	41%	39%	41%	39%	38%	38%	38%	34%	34%	33%
Sea Harvest													
Sea Harvest	34%	33%	33%	31%	30%	32%	30%	29%	29%	29%	27%	27%	26%
Atlantic Trawling	10%	10%	10%	10%	9%	10%	9%	9%	9%	9%	8%	8%	8%
Total	44%	43%	43%	41%	39%	41%	40%	38%	38%	38%	35%	35%	34%
Oceana													
Blue Continent Products	0.5%	0.5%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.6%
Blue Continent Products-b							0.5%	0.3%	0.5%	0.5%			
Total	0.5%	0.5%	0.4%	0.4%	0.4%	0.4%	0.9%	0.7%	0.8%	0.8%	0.4%	0.4%	0.6%
Foordcorp													
Marine Products	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Premier Fishing													
Atlantic Fishing Enterprises		0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%			
John Ovenstone							0.3%	0.3%	0.3%	0.3%			
Premier Fishing											0.5%	0.5%	0.6%
Total		0.1%	0.1%	0.1%	0.1%	0.1%	0.3%	0.4%	0.4%	0.4%	0.5%	0.5%	0.6%
Lohe Galero Holdings (Lusitania)													
Algoa Bay Sea Products		0.2%	0.2%	0.2%		0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.4%
Fernpar Fishing		2.0%	2.0%	1.9%	1.8%	1.9%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%
Radaco Sea Products		0.4%	0.4%	0.4%		0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.5%
Total		2.0%	2.6%	2.5%	2.4%	2.5%	2.4%	2.3%	2.3%	2.3%	2.5%	2.5%	2.7%
Pioneer Fishing													
Saco Ciskei							0.5%	0.5%	0.1%	0.1%			
Saco Fishing				0.2%	0.1%	0.2%	0.1%	0.1%	0.5%	0.5%	0.7%	0.7%	0.7%
Total				0.2%	0.1%	0.2%	0.7%	0.6%	0.6%	0.6%	0.7%	0.7%	0.7%
Viking Fishing													
Viking Fishing	2.2%	2.1%	2.1%	2.0%	1.9%	2.0%	1.9%	1.9%	1.9%	1.9%	2.2%	2.2%	2.2%
Trachurus Fishing													
Trachurus Fishing	0.6%	0.7%									0.9%	0.9%	1.0%
B P Marine Fish Products			0.1%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%			
Total	0.6%	0.7%	0.1%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.9%	0.9%	1.0%
TOTAL													
Total Corporate	97%	97%	96%	92%	88%	92%	90%	86%	87%	87%	81%	81%	80%

Data source: FIHB (1990 to 2002)

The share of the TAC controlled by the two largest companies, Irvin and Johnson and Sea Harvest, has fallen from 1990 to 2002 by 21% of the TAC. The other corporate companies increased their joint control over the TAC by 4% in the same period.

7.8 STRONG VS WEAK REDISTRIBUTION: DEEPSEA HAKE TRAWL FISHERY

In terms of strong redistribution criteria by 2002, the deepsea hake trawl fishery had the following indicators:

a Fishing capital (access rights)—12% of fishing power and 15% of vessels changed hands.

b Human capital (composite indicator)—64.3% for professional and 59.2% for skilled fishers.

c Resource rent (as a proportion of the TAC as quota shares)—14% of the TAC was redistributed.

The binding constraint on redistribution in the deepsea hake trawl fishery is the potential for the transfer of fishing capital and the redistribution of the resource rent (as a portion of the TAC) by MCM. Also of importance for redistribution, capacity management and informational efficiency is the linking of the number of vessels, vessel holding companies and quota holders. This is illustrated in figure 7.5 below.

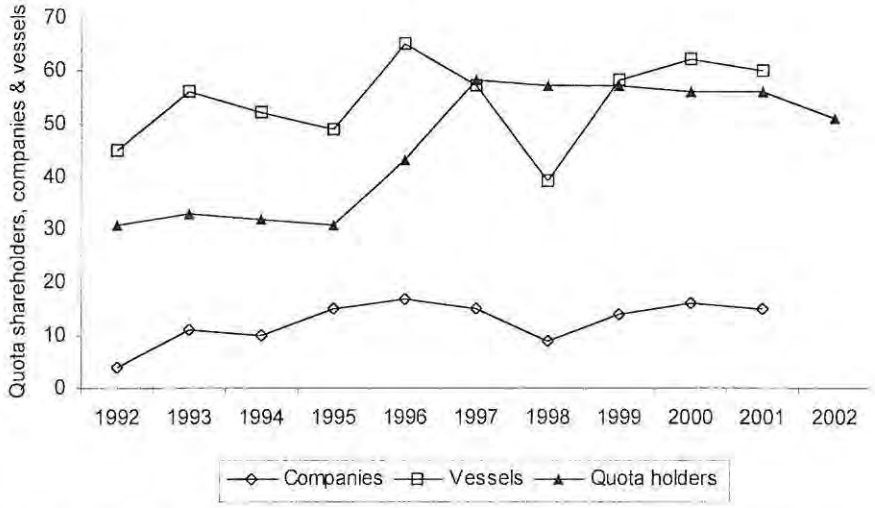

Figure 7.5: The number of companies, vessels and quota holders in the deepsea hake trawl fishery (1992 to 2001).
Data source: FIHB (1992 to 2002)

The situation where the number of quota holders is equivalent to the number of vessels is stable only if each vessel was individually owned or the quota share was attached to the vessel. The South African deepsea hake trawl fishery does not, however, conform to either. The control over the access rights is highly concentrated (89% is controlled by corporate fishing companies, table 7.6, section 7.7.1) and the

number of companies definitely does not equal the number of vessels (see figure 7.5 above). Although from the human capital side the deepsea hake trawl fishery is more advanced than the other fisheries covered so far (a composite indicator of 64.3% for professional fishing people and 59.2% for skilled fishers), the weak redistribution criterion, namely 14% of the TAC to new quota holders who comprise 61% of all quota holders, does not seem to have had much of an effect on strong redistribution.

Given the unconvincing weak redistribution strategy in this fishery (14% of the TAC to the majority who are new quota holders) the concept of 'internal transformation' where the fishing corporate companies are expected, or encouraged, to reform their employment and executive positions to more equally reflect the racial distribution of the country (chapter 2) seems to be favoured by MCM. Also, the racial distribution in terms of ownership (strong redistribution) of these companies is presumably expected to occur through the capital market. Penzhorn (2000), provides an indication of the opportunity costs by stating that a minimum viable asset size of 1000 tons is possible, providing that the monopsonistic processing companies assist with processing and marketing. With a TAC in the region of 120 000 tons, a conservative 90 small to medium black economic empowerment companies can be created. However, the organizational failure of MCM, the additional information costs, extension service costs, a focus on resource as opposed to fisheries management and MCM's preference toward redistribution 'events' rather than viewing redistribution and black economic empowerment as a development process, makes the second option seem unlikely. In any event, the private sector changed its mind on the usefulness of minimum viable asset sizes. Bross (2002) for example, argues that in the deepsea hake trawl fishery, minimum viable asset sizes are meaningless.

7.9 OVERVIEW: SOUTH COAST ROCK LOBSTER (SCRL) FISHERY

Japp & Groeneveld (2001:3) report that south coast rock lobster (*Palinurus gilchristi*) occur on the continental shelf between East London and Cape Agulhas, up to 250 km offshore along the outer edge of the Agulhas Bank and at depths of 50m to 200m. Steel-hulled large vessels rigged for long-line trapping are used to harvest south coast rock lobster. The vessels operate 20 to 30 long-lines with 100 to 200 barrel-shaped plastic traps tied to each line. To operate the long-lines the vessels require a holding

pen where the traps are stacked, one or two chutes to set the gear, and line-haulers to retrieve the traps. The vessels are also usually equipped with onboard packing and freezing facilities.

The fishing season starts on 1 October and ends on 30 September the following year (all year round). According to Japp & Groeneveld (2001:8) harvesting is limited by applying a combination of a TAC and TAE (total applied effort) strategy. The TAE is measured in sea days allocated to each vessel[8]. The vessel can fish until either its sea days expire or its proportion of the TAC is harvested. The number of sea days is monitored by a vessel monitoring system (VMS). Catches may only be off-loaded and weighed at designated off-loading points and in the presence of Marine Control Officers. Exporters of south coast rock lobster still need an export permit from MCM, Japp & Groeneveld (2001:8).

7.10 THE STRUCTURE OF THE FISHING FLEET: SCRL FISHERY

Due to the specialized nature of south coast rock lobster harvesting, most vessels participating in this fishery are dedicated single species vessels.

Table 7.8: The number of vessels and fishers and the average length, age, GRT and Kwt of the south coast rock lobster fleet (1993 to 2001).

	1993	1994	1995	1996	1997	1998	1999	2000	2001
Average length	44	46	45	45	49	48	51	50	51
Average age	21	20	20	21	21	21	23	24	25
Average GRT	383	459	425	449	477	457	503	538	538
Average Kwt	786	904	809	896	968	946	968	1012	1012
Vessels	14	14	12	15	8	7	8	9	9
Fishers	410	429	361	445	267	227	260	265	265

Data source: FIHB (1993 to 2002)

Table 7.8 above shows that since 1993 the south coast rock lobster fleet has displayed increases in the average length, average gross registered tonnage, average engine power (Kwt) and average age. The number of vessels and the number of fishers has however decreased in the same period. Simply, the vessels were getting larger and

[8] Its fishing capacity and the proportion of the TAC that is allocated to it by the quota holders determine the sea days, or days that the vessel is allowed to spend at sea. Fishing capacity is based on winch power, the number of chutes to set gear and whether it prefers to fish in summer or winter (Japp & Groeneveld, 2001:8).

more powerful, therefore also more capital intensive. Figure 7.6 highlights this trend toward larger vessels with a greater fishing power.

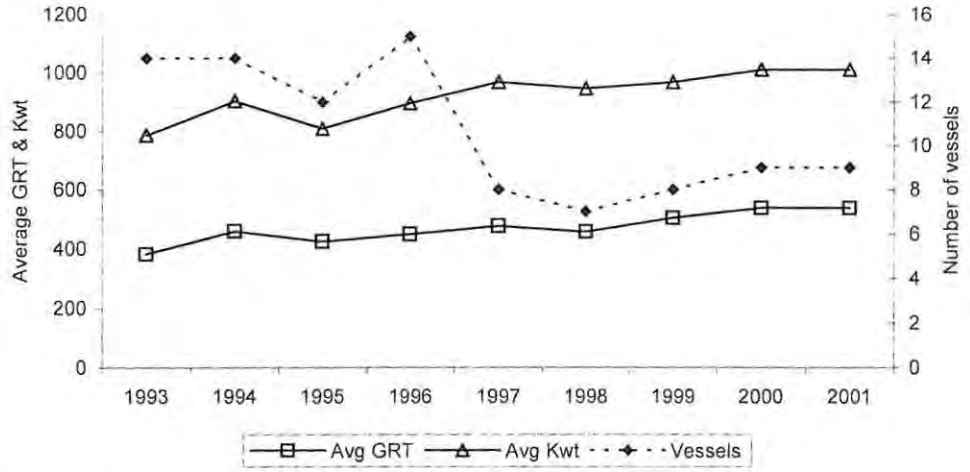

Figure 7.6: Trend of vessel length and fishing power (GRT and Kwt) in the south coast rock lobster fishery (1993 to 2001).
Data source: FIHB (1993 to 2002)

The median length of the vessels in the fleet from 1993 to 2001 has, however, remained within the large vessel <40m to 50m ranges. The structure of the south coast rock lobster fleet is presented in appendix A10.

7.11 ACCESS RIGHTS: SCRL FISHERY

The entry and exit of companies holding access rights (vessel owners or charterers) to the south coast rock lobster fishery between 1993 and 2001 is presented in table 7.9. Appendix A10 presents the entry and exit of access right holders by company name.

Table 7.9: The entry and exit of access right holders into and out off the south coast rock lobster fishery (1993 to 2001).

		1993	1994	1995	1996	1997	1998	1999	2000	2001
NE (s)	Companies			1			1		1	
	Vessels			1			1	2	2	
	Fishers			30			32	64	72	
NE (s) cum	Companies			1		1	2	2	3	3
	Vessels			1		1	2	4	6	6
	Fishers			30		32	64	128	200	200
1993 Co	Companies	7	7	5	4	2	2	2	2	2
	Vessels	14	14	12	14	5	4	4	3	3
	Fishers	410	429	331	421	160	129	132	90	90
NE (u)	Companies				1	1	1			
	Vessels				1	2	1			
	Fishers				24	75	34			
Total	Companies	7	7	6	5	4	5	4	5	5
	Vessels	14	14	12	15	8	7	8	9	9
	Fishers	410	429	361	445	267	227	260	290	290
% NE all	Companies			17%	20%	50%	60%	50%	60%	60%
	Vessels			8%	7%	38%	43%	50%	67%	67%
	Fishers			8%	5%	40%	43%	49%	69%	69%

NE(s): entry of successful new entrants, NE(s) cum: cumulative entry of successful new entrants, 1993 Co: companies that held access rights in the SCRL fishery during 1993, NE(u): entry of unsuccessful new entrants, %NE all: the number of new entrant access right holders in any particular year.
Data source: FIHB (1993 to 2002)

The number of vessels and fishers employed by new entrant access right holding companies has increased to 67% of all vessels and 69% of all fishers employed in the fishery. Most of the successful new entrant companies entered, and grew, into the fishery during and after 1998. This falls within the time under the Marine Living Resources Act.

7.12 SKILLS DISTRIBUTION: SCRL FISHERY

As with all the other TAC fisheries covered in this thesis, the data from Mather et al (2002) is used to calculate a composite index of the racial distribution of fishing skills in the south coast rock lobster fishery. Although the large vessels employ professional skippers and navigators, the data for this group is unreliable. Indicators of the racial distribution of skills for full time and part time skilled fishers is presented in table 7.10 below

Table 7.10: Indicators of the racial distribution of skills in the south coast rock lobster fishery.

	Skilled fishers			
	Full time		Part time	
	Black	White	Black	White
Average income[1]	R 77 538	R 210 000	R 96 000	R 170 000
% Black[2]	96.3%		76.9%	
Adjusted % Black	100.0%		96.1%	
Income difference	37.0%		56.5%	
Composite indicator	37.0%		54.3%	

[1&2] Data source: Mather et al (2002)

Because of a very high income-difference, the composite indicator of racial distribution of skills[9] for full time skilled fishers (37%) is lower than that for part time skilled fishers (54%).

7.13 DISTRIBUTION OF QUOTA SHARE: SCRL FISHERY

Figure 7.7 below shows the rise in the number of new quota holders (defined as quota holders who received a quota share after 1993) and the distribution between new quota holders and old quota holders (those that held quota shares before 1994).

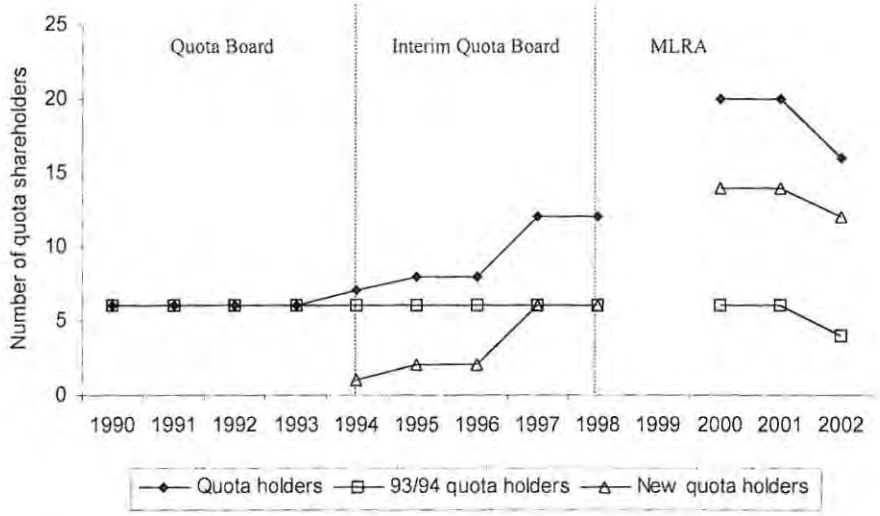

Figure 7.7: Distribution of quota shares between old and new south coast rock lobster quota holders (1989 to 2002).
Data source: FIHB (1990 to 2002)

[9] The composite indicator is the demographically adjusted percentage of Black fishers weighted by the income difference between Black and White fishers in the same skills category (see chapter 6).

The redistribution or broadening of the quota share base occurred primarily during the Interim Quota Board time and under the quota share distribution institutions of the Marine Living Resource Act (MLRA). The actual entry and exit of quota holders under the three distribution institutions is presented in table 7.11 below. Successful quota holders are defined as those quota holders who were awarded a quota share during 2002; unsuccessful ones were not awarded a quota share during 2002.

Table 7.11: The entry and exit of quota holders into and out of the south coast rock lobster fishery (1991 to 2002).

	1991	1992	1993	1994	1995	1996	1997	1998	2000	2002
	Quota Board				Interim Quota Board				MLRA	
Quota holders	6	6	6	7	8	8	12	12	20	16
Successful quota holders										
Old quota holders	6	6	6	6	6	6	6	6	6	4
New quota holders				1	2	2	6	6	14	12
Entry of new quota holders										
New quota holders (s)					2		3		5	2
New quota holders (u)				1			1		4	
Exit of unsuccessful quota holders										
Old quota holders										-2
New quota holders					-1				-1	-4

(s): successful quota holders, (u) unsuccessful quota holders
Data source: FIHB (1991 to 2002)

With regard to table 7.11, a number of observations regarding the distribution of quota shares can be made. During the Quota Board time, only one unsuccessful quota holder was added. The Interim Quota Board added six new quota holders, five of them successfully. Eleven quota holders were introduced under the institutions of the Marine Living Resources Act, seven were successful and four unsuccessful. Of the original six quota holders (old quota holders) four made it through to the 2002 medium term allocation round. Finally, the quota share base increased from six quota holders during 1991 to an eventual 16 in 2002, changing the asset size distribution between the quota holders. The asset size distribution between the south coast rock lobster quota holders is illustrated in table 7.12 below.

Table 7.12: The characteristics of the south coast rock lobster asset sizes in tons of tail whole mass (1991 to 2002).

	1991	1992	1993	1994	1995	1996	1997	1998	2000	2002
	Quota Board				Interim Quota Board				MLRA	
Average	75	75	75	64	54	53	34	33	19	15
Std dev	85	85	85	79	69	69	55	53	27	23
Highest	226	226	226	221	204	202	187	181	130	101
Lowest	44	44	44	43	12	12	5	5	4	6
Diff high to low	183	183	183	179	192	191	182	176	126	95
Quota holders	6	6	6	7	8	8	12	12	20	16

Data source: FIHB (1991 to 2002)

Table 7.12 shows the trend that with an increase in the number of quota holders, the difference between the largest asset size and the smallest asset size decreased. However, from 1991 to 2002 the smallest asset size fell from 44 tons to 6 tons tail whole mass, and the largest dropped from 226 tons to 101 tons. In other words, the 2002 minimum asset size was 14% of the 1991 minimum asset size and the 2002 maximum asset size was 45% of the 1991 maximum asset size. The difference in asset size old quota holders and new quota holders provides the evidence on the distribution and redistribution of the resource rent.

The distribution of the TAC between old and new quota holders is represented in table 7.13 below. The share of the TAC controlled by old quota holders dropped by almost 60% of the TAC from 1991 to 2002. Two old quota holders who held the large asset sizes, however, dropped out before 2002. The TAC split between old quota holders and new quota holders during 2002 was 38% to 32% respectively, with 30% of the TAC held in reserve[10].

[10] The reserve was held because i) a court case was pending on the Hout Bay Fishing Industries company for over-fishing and ii) in the advent of other unsuccessful applicants appealing the allocation process.

Table 7.13: The percentage distribution of the south coast rock lobster TAC between old and new quota holders (1991 to 2002).

	1991	1992	1993	1994	1995	1996	1997	1998	2000	2002
	Quota Board				Interim Quota Board				MLRA	
Atlantic Fishing Enterprises	50%	50%	50%	49%	48%	47%	45%	45%	34%	30%
Hout Bay Fishing Industries	28%	28%	28%	27%	26%	26%	25%	25%	11%	
Lusitania Fishing Company	10%	10%	10%	9%	9%	9%	9%	9%	7%	
Baratz Fishing	5%	5%	5%	5%	5%	5%	5%	5%	4%	3%
SA Sea Products	4%	4%	4%	4%	4%	4%	3%	3%	4%	3%
Seafarer Dist	3%	3%	3%	3%	3%	3%	3%	3%	2%	2%
Total old quota holders	100%	100%	100%	98%	95%	94%	89%	89%	62%	38%
South Coast Sea Products										7%
Bluefin Fishing									4%	3%
Eastern Marine Enterprises							1%	1%	4%	3%
Cisco Fishing					3%	3%	3%	3%	4%	3%
Imbumba Fishing									3%	2%
Oliphant P & Partners							1%	1%	3%	2%
Risar Fishing							1%	1%	3%	2%
Phambili Fisheries									3%	2%
C & S Underwater					3%	3%	3%	3%	2%	2%
Marine Products (Foodcor)										2%
AFD Fishing									2%	2%
Arniston Fish Processors									2%	2%
Total new quota holders (s)					5%	5%	9%	9%	29%	32%
Fullinput 2									4%	
Amandla Abasebensi									2%	
Tradequick 62									1%	
Lusitania Fishing									1%	
Phakamisa Fishing				2%			1%	1%		
Total new quota holders (u)				2%			1%	1%		
Total new quota holders				2%	5%	5%	10%	10%	29%	32%
Research						0.5%	0.5%	0.5%		
Reserve										30%

(s): successful quota holders, (u) unsuccessful quota holders.
Data source: FIHB (1991 to 2002)

Table 7.13 provides more detail to table 7.11. The redistribution of quota shares to new quota holders (both successful and unsuccessful) increased from 2% of the TAC in 1994 (Quota Board) to 10% of the TAC in 1998 (after the Interim Quota Board) and finally to 46% of the distributed TAC[11] in 2002 under the Marine Living Resources Act. From a redistribution policy point of view, the quota share distribution institutions under the Marine Living Resources Act were the most successful. As has already been witnessed, the South African fisheries examined in this thesis are all characterized by some corporate control of access rights (fishing capital) and the TAC (resource rent). This is discussed below.

[11] Only 70% of the TAC was distributed during 2002.

7.14 CONTROL: SCRL FISHERY

Again the derivation of corporate structures presented in appendix A3 is used to determine the concentration of fishing capital (access rights) and the TAC (resource rent) for the south coast rock lobster fishery.

7.14.1 Access Rights (Fishing Capital)

Using a derived corporate structure the corporate control of access rights to the south coast rock lobster is presented in table 7.14 below.

Table 7.14: Control of access rights (fishing capital) in the south coast rock lobster fishery (2000 and 2001).

	2000		2001	
	Vessels	Fishers	Vessels	Fishers
Premier Fishing				
Premier Fishing (99)	44%	46%	44%	46%
Hout Bay Fishing				
Hout Bay Fishing	22%	22%	22%	22%
Lohe Galero Holdings				
Baratz Fishing	11%	9%	11%	9%
Total				
Total	78%	77%	78%	77%

Three companies, dominated by Premier Fishing, control 78% of the fishing capital and employ 78% of all fishers. The Hout Bay Fishing Company is added into the corporate structures because it was an important player up until 2002—during 2000 and 2001 it controlled 22% of fishing capital in the fishery. Although the Baratz Fishing company is placed under the Lohe Galero Holding Group, it is in fact one of the empowerment companies established by Mr JG Fernandez[12] and represents a joint venture ownership of the vessel Baratz.

7.14.2 Quota Shares (Resource Rent)

The control over the quota shares, or resource rent, by corporate fishing companies is presented in table 7.15 below. The structure of the Hout Bay Fishing Company is determined by Japp & Groeneveld (2001:15).

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[12] Mr JG Fernandez sits on the Board of the Baratz Fishing Company and is involved in a number of empowerment initiatives in the fishing industry. He is also the chairman of the Lohe Galero Holding Group (see appendix A3).

Table 7.15: Control over the TAC (resource rent) in the south coast rock lobster fishery (1990 to 2002).

	1990	1991	1992	1993	1994	1995	1996	1997	1998	2000	2002
	Quota Board					Interim Quota Board				MLRA	
Premier Fishing											
Atlantic Fishing Ent	50%	50%	50%	50%	49%	48%	47%	45%	45%	34%	30%
Hout Bay Fishing[1]											
Hout Bay Fishing Ind	28%	28%	28%	28%	27%	26%	26%	25%	25%	11%	
Amandla Abasebensi										2%	
Tradequick 62										1%	
Fullimput 2										4%	
Total	28%	28%	28%	28%	27%	26%	26%	25%	25%	19%	
Lohe Galero Holdings											
Baratz Fishing	5%	5%	5%	5%	5%	5%	5%	5%	5%	4%	3%
C & S Underwater						3%	3%	3%	3%	2%	2%
Lusitania Fishing										1%	
Lusitania Fishing Company	10%	10%	10%	10%	9%	9%	9%	9%	9%	7%	
South Coast Sea Products											7%
Seafarer Dist	3%	3%	3%	3%	3%	3%	3%	3%	3%	2%	2%
Total	18%	18%	18%	18%	18%	20%	20%	19%	19%	16%	13%
Oceana											
SA Sea Products	4%	4%	4%	4%	4%	4%	4%	3%	3%	4%	3%
Foodcorp											
Foodcorp											2%
Pioneer Fishing											
Cisco Fishing						3%	3%	3%	3%	4%	3%
Total											
Total	100%	100%	100%	100%	98%	100%	100%	95%	95%	77%	51%
Total (reserve discounted)											73%

Data source: FIHB, [1]: Japp & Groeneveld (2001:15)

The corporate control over the resource rent has dropped from 100% in 1996 to 95% in 1998 to 73% during 2002. The 2002 figure of 73% is the corporate control discounting the amount held in reserve. The 30% held in reserve (RSA, 2001f) was for 1) Hout Bay Fishing and its subsidiaries if they won their court case and proved that they had not for a number of years harvested a far greater amount of the south coast rock lobster resource than their quota share stipulated, and 2) an amount held over in case of appeals to the quota share allocation process[13].

[13] Holding a portion of the TAC as a hedge against successful appeals is, on the one hand, prudent because it means that quota shares are available without having to either increase the TAC or take a portion of each quota holder's quota share, but on the other hand it is an admission that the allocation process is faulty.

7.15 STRONG VS WEAK REDISTRIBUTION: SCRL FISHERY

The indicators for strong redistribution are as follows:

a Fishing capital (access rights)—67% of fishing vessels that held access rights in the south coast rock lobster fishery changed hands. Again the racial distribution of ownership is difficult to determine and this should only be taken as an indicator, and a weak one at that.

b Human capital—using the composite human skills indicator, the absorption of Black fishers into the skilled fisher category is 30.0% for full time fishers and 54.3% for part time fishers.

c Resource rent—by 2002, 32% of the TAC had been redistributed to new quota holders.

Redistribution in terms of resource rent and human capital is around 30%. Corporate fishing companies, some of which are Black Empowerment capital market companies, for example, Sekunjalo Investments, control over 70% of this fishery.

Figure 7.8 below provides an illustration of the number of access rights, the number of quota shares and the number of access right holding companies in the south coast rock lobster fishery.

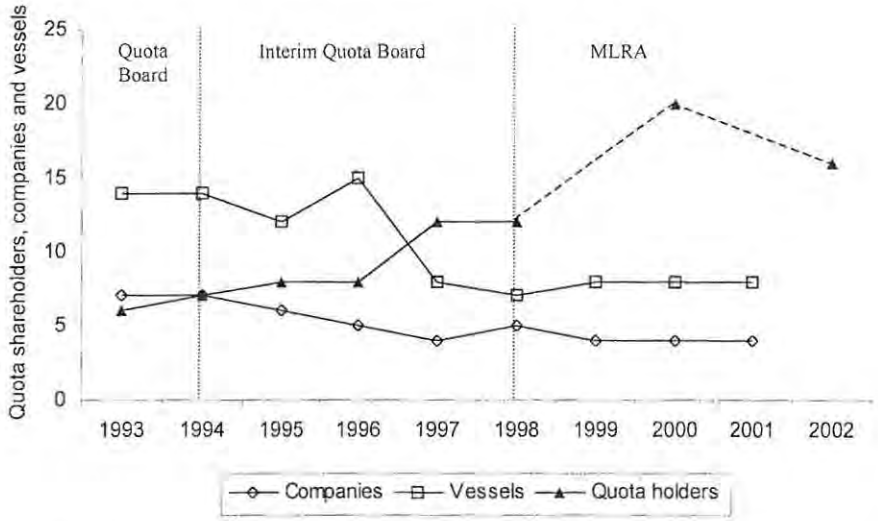

Figure 7.8: Vessels (access rights), access right holding companies (companies) and quota holders in the south coast rock lobster fishery (1993 to 2002).
Data source: FIHB (1993 to 2002)

The important observation from figure 7.8 is that, since about 1997, the number of quota shares has exceeded the number of access rights. Furthermore, the number of quota shares up until 2002 increased. This could present a possible over-capacity problem later.

7.16 SUMMARY: LARGE VESSEL TAC FISHERIES

The trend in the broadening of the quota share base in the large vessels fisheries is displayed in figures 7.9 and 7.10.

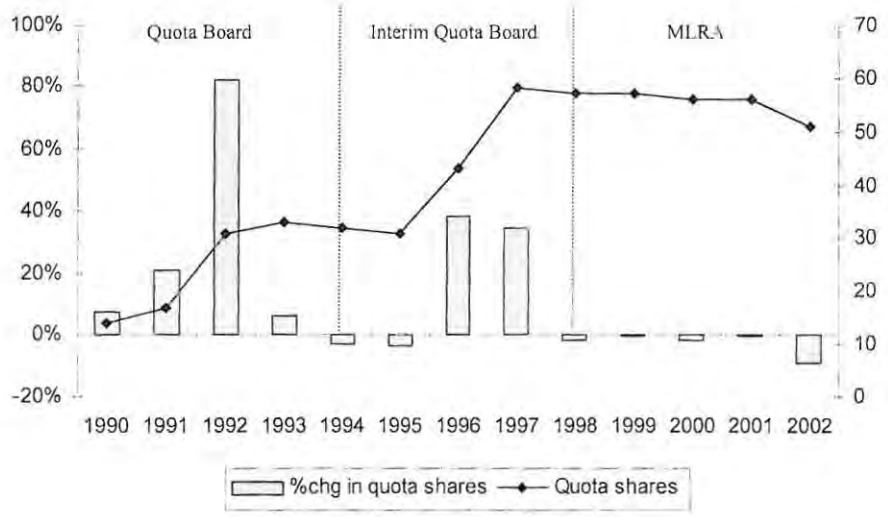

Figure 7.9: The broadening of the quota share base in the deepsea hake trawl fishery (1993 to 2002).
Data source: FIHB (1990 to 2002)

The deepsea hake trawl fishery went through two periods of broadening the quota share base. The first was implemented during the Quota Board time, particularly the years 1990, 1991 and 1992. The second period occurred during the Interim Quota Board time during 1996 and 1997. However, a redistribution of quota shares occurred (some quota holders were replaced with other quota holders) under the Interim Quota Board and the institutions under the Marine Living Resources Act.

The first period of broadening of access in the south coast rock lobster fishery coincided with the second period of broadening of access of deepsea hake trawl fisheries (during the Interim Quota Board time). The second and more significant

broadening of access and redistribution of the TAC was instituted under the Marine Living Resource Act, in particular years 1998 and 2000. This is illustrated on figure 7.10 below.

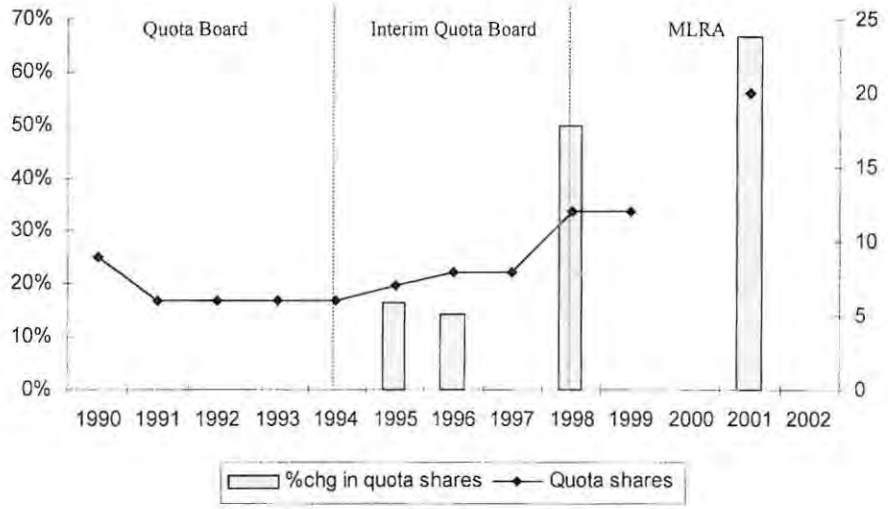

Figure 7.10: The broadening of the quota share base in the south coast rock lobster fishery (1990 to 2002).

There was a period of consistency in the broadening of access strategies and redistribution agendas in the large vessel TAC fisheries, namely, during the Interim Quota Board time particularly during 1996.

The extent to which fishing capital can potentially have been redistributed and the absorption of Black fishers into the skilled fishing pool are both indicators of strong redistribution. Table 7.16 provides these indicators for the large vessel TAC fisheries.

Table 7.16: Access rights and skills for large vessel TAC fisheries (2001).

		Deepsea Hake Trawl	South Coast Rock Lobster
Fleet characteristics	Average length Average age Vessels Fishers	48m 25 years 60 vessels 2085 fishers	51m 25 years 9 vessels 265 fishers
Access rights % New entrants	Companies Vessels Fishers Fishing Power	47% 15% 15% 12%	60% 67% 69%
Skills[I]	Full time Part time	59.2%[II]	37.0% 54.3%

[I]: Composite index, [II]: for skilled fishers (64.3% for professional fishing staff)

The south coast rock lobster fishery shows a higher potential in the distribution of access rights or fishing capital than the deepsea hake trawl fishery. On the other hand, the deepsea hake trawl has advanced more in the absorption of Black skilled fishers. The distribution of quota shares and the TAC between old and new quota holders is illustrated below in table 7.17.

Table 7.17: Quota shares, average asset sizes and percentage of the TAC of new quota holders (2001 south coast rock lobster, 2002 deep sea hake trawl).

		Deepsea Hake	South Coast Rock Lobster
New Quota Holders	% of Quota Shares	61%	75%
	% of TAC	14%	32%
New quota holder asset size[1]		11%	28%

[1]: The proportionate size of the average asset size of new quota holders in relation to the average asset size of old quota holders

Based on figure 7.17, although the percentage of new quota holders is larger in both fisheries, the percentage of the TAC held by the new quota holders shows that weak redistribution in the deepsea hake trawl fishery and the south coast rock lobster fishery is still low, 11% and 28% respectively.

As would be expected in large vessel fisheries, the corporate control is very high in both. This is illustrated in table 7.18. Although the vessel sizes are on average larger in the south coast rock lobster fishery than the deepsea hake trawl fishery (table 7.16), corporate fishing company control is higher in the deepsea hake trawl fishery.

Table 7.18: Corporate control over the access rights in the large vessel TAC fisheries (2001).

	Vessel Ownership	
	Deepsea Hake	South Coast Rock Lobster
Irvin & Johnson	44%	
Sea Harvest	29%	
Viking	7%	
Foodcorp	5%	
Oceana	3%	
Premier	0.4%	46%
LGH[1]		9%
Pioneer		
Hout Bay Fishing		22%
Total	88%	77%

[1]: Lusitania empowerment companies under the Lohe Galero Holdings

The corporate control over the resource rent (or the TAC), illustrated in table 7.19 below is likewise high in both fisheries, but somewhat lower than the control over the fishing capital. This indicates that corporate fishing companies lease a fair portion of the TAC redistributed to new quota holders (a clear indication of weak transformation).

Table 7.19: Corporate control over the TAC of the large vessel fisheries (2002).

	% of the TAC	
	Deepsea Hake	South Coast Rock Lobster
Irvin & Johnson	33%	
Sea Harvest	34%	
Viking	2.2%	
Foodcorp	5%	2%
Oceana	0.6%	3%
Premier	0.6%	30%
LGH	2.7%	13%
Pioneer	0.7%	3%
Hout Bay Fishing		(19%)[I]
Total	79%	51% (73%)[II]

[I]:Hout Bay was not awarded a right in 2002 and subsequently lost access to this fishery, [II]: Total excluding the reserve % of TAC held over

Again, corporate control over the resource rent in the deepsea hake trawl fishery is higher than in the south coast rock lobster fishery.

7.17 CONCLUSION

Both the deepsea hake trawl and the south coast rock lobster fisheries use large vessels. Although the south coast rock lobster fishery utilizes, on average, larger vessels, the size of its fleet is about 75% smaller than the deepsea hake trawl fleet. The south coast rock lobster fishery established itself as a viable fishery at least 70 years after the deepsea hake trawl fishery. In other words, although the initial capital outlays in the south coast rock lobster fishery are probably larger, the corporate fishing companies operating in the deepsea hake trawl fishery are an entrenched interest group that have fought and won many battles with the state to retain monopsonistic power (van Sittert, 2003). The differences are illustrated by the greater distributional success in the south coast rock lobster fishery.

CHAPTER EIGHT
CONCLUSIONS AND POLICY OPTIONS

8.1 INTRODUCTION

Conclusions are drawn in this chapter regarding the reasons, within an historical framework and a system of individual fishing rights, why MCM experienced organizational failure and how it dealt with this problem. The structure of individual fishing rights that evolved in response to a monopsonistic industrial organization during the apartheid era in South Africa, re-emerged as a solution to correct for MCM's organizational failure. This policy was applied across the board and works against equity and redistribution. The evidence suggests, however, that different fisheries face different constraints and should in certain instances be treated separately. The thesis ends with an opinion on fisheries management policy.

8.2 ORGANISATIONAL FAILURE

With the creation of the 200 nautical mile EEZ during 1977, all the major commercial TAC fisheries in South Africa fell within a state property zone. Fisheries now had to be managed, consciously or not, as microeconomic systems. The essential features of managing the fishery are: first, overcoming the inherent design problem, namely, that failure to abide by an *a priori* output constraint in the form of a TAC or TAE may result in the entire fishery collapsing. Second, the need to impose an output, or effort, constraint and the inability of the market to allocate private individual fishing rights[1] gives credibility to state intervention. The fundamental task of the state in a TAC fishery, after setting the output constraint, is to design individual fishing rights that fulfill the economic, political and social objectives of the state. Chapter three illustrates the feasible options available and highlights a trade-off, in terms of flexibility (information and coordination costs) and efficiency.

Following the enforcement of an EEZ, South Africa followed the world trend by introducing quota management systems and creating individual fishing rights. Also,

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[1] In the previous centrally controlled economic systems, this aspect of managing the fishery was absent; state capital in the form of fishing vessels and processing facilities was used. In fact the competitive forces that drive fishers to overexploit the resource are removed in this system.

several attempts to provide security to these 'quasi-property rights' by making them long-term and tradable met with various degrees of success. The initial allocation of quota shares to fishing companies in all the existing TAC fisheries was also in line with global trends, namely, on the basis of historical catch records. However, South Africa evolved, in response to both apartheid intervention and the power of monopoly capital (van Sittert, 2003), a unique structure of individual rights. In particular, the dual structure separates the 'right of participation' to access from the 'right of participation' to a portion of the TAC. This dual structure (established in chapter three) is presented in figure 8.1 below.

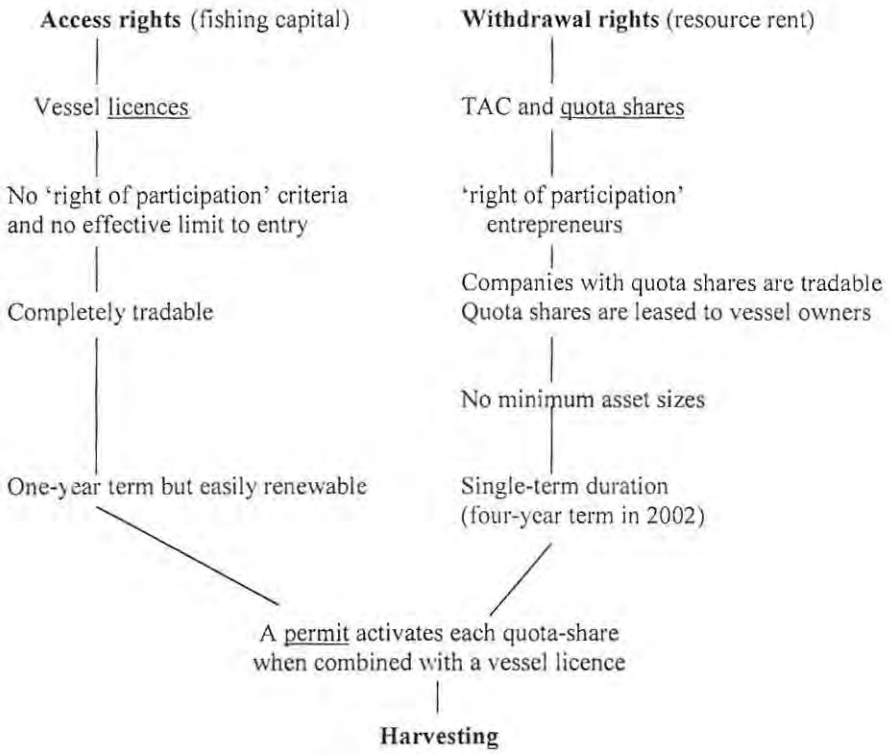

Figure 8.1: The dual structure of individual fishing rights for the South African commercial TAC fisheries

In effect this dual structure allows companies without fishing vessels, or the means to fish, an individual right to a portion of the TAC, that is, a portion of the total resource rent. The basic rationale behind this was, initially at least, to protect the monopsonist's claim to the resource rent. In the micro to small vessel fisheries, the dual structure effectively enabled the apartheid state to control, or outlaw, the fishers by giving the rights to harvest to the processing and marketing companies. A similar

arrangement seemed to have occurred in the medium vessel pelagic fishery. Monopsonists themselves protected, through various means, their control over the inshore trawl and deepsea hake trawl fisheries. In other words, the structure of fishing rights evolved to suit monopsonistic capital.

As a result of this evolved structure, quota shares were not linked to fishing vessels, or the capacity of the fleet, and asset sizes simply determined the degree of monopsonistic control each company commanded. In addition, the tradability of the quota shares was initially unimportant, as fishing companies, along with their quota shares, could be bought and sold at will. In effect this arrangement gave the South African fishing companies the flexibility (which perhaps are among the most flexible in the world) necessary to achieve technological efficiency. In time the large fishing companies vertically integrated by absorbing the harvesting activities. The emergent consolidated industrial organization ensured that the informational and coordination costs of fisheries management were minimized. Fundamentally, the evolved structure of individual fishing rights was at first efficiency-enhancing.

This structure of individual fishing rights, termed partially tradable $\text{UNATTACHED}_{\text{TAC}}$ quota share in chapter three, persisted through the Diemont Commission (1986), the Fishing Policy Development Committee (1994 to 1997) into the Marine Living Resources Act of 1998, and the last round of policy debate (2000 to 2001) and still exists today. The flexibility of the system is the reason why the structure persisted—it is easy to reallocate a portion of the TAC to almost anybody and in very small asset sizes. The logic of efficient systems, however, would predict a large increase in information and coordination costs as the quota share base expands (also an increase in transaction costs in the private sector). This is exactly what happened. As more quota shares, usually of sub-economic asset sizes, were awarded supposedly to new black quota holders, the informational and coordination requirements to efficiently implement and enforce the fisheries management system increased. Also, the incidence of influence costs to MCM and to the private sector rose substantially.

As MCM[2] was accustomed to a compliant monopsonistic industrial organization, it did not have the capacity to implement or enforce most of its fisheries management plans and consequently experienced an organizational failure from 1998. An illustration of how the quota share base increased (summarized from chapter 5, 6 and 7) is provided in figure 8.2 below.

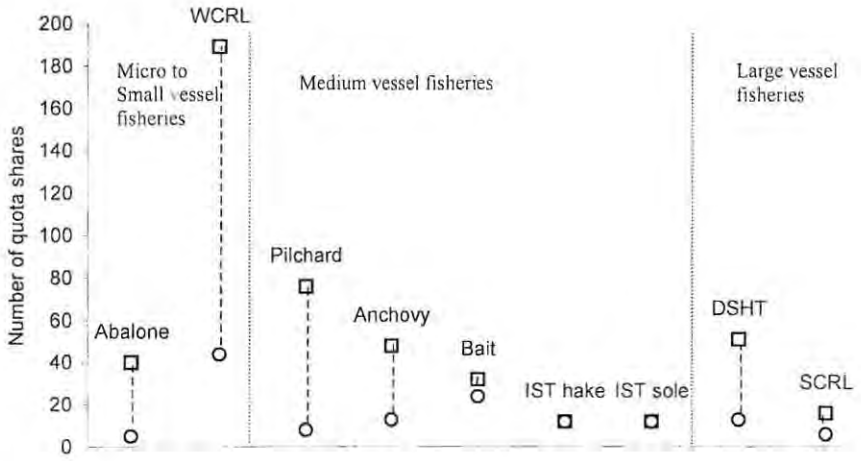

Figure 8.2: The increase in quota shares (dashed lines) from 1990 to 2002.
WCRL: west coast rock lobster, IST: inshore trawl, DSHT: deepsea hake trawl, SCRL: south coast rock lobster. Pelagic (pilchard, anchovy and bait) are for 2001

The total number of quota shares in the major commercial TAC fisheries increased from 137 during 1990 to 476 in 2002, a 347% increase. If the limited commercial quota shares in the micro to small vessel TAC fisheries (abalone and west coast rock lobster) are included, this brings the total to 971 quota shares in 2002 or a 709% increase. Again if the number of hake long-line quota shares is added, which increased from 43 in 2000 to 115 in 2002, the net increase[3] in quota shares is 797%. Consider that for MCM to efficiently implement the fisheries management plan, based on the structure of individual fishing rights, it has to, as a preliminary, record i) all trades in fishing companies, ii) all leases of quota shares, and iii) what vessels

[2] Highly qualified white government scientists dominate MCM with a focus on resource management (setting and understanding the environmental constraints to fishing). The good relationship between government scientists and monopoly capital is documented by van Sittert (2003).
[3] This net total only includes the fisheries covered in the thesis; however, according to the ESS (2002) hake hand-line effort permits amounted to approximately 330 vessels, line fish approximately 2600 effort permits (this fishery has subsequently collapsed and the number of permits has been reduced to about 400), eight Kwa-Zulu Natal prawn trawl effort permits, 23 shark long-line effort permits, and 2324 squid fisher permits, to mention a few in the fisheries governed by total allowable effort.

harvested which species and whose quota share they used. The informational and coordination costs must therefore increase by considerably more than the 797% enlargement of the quota share base.

8.3 CORRECTING FOR ORGANIZATIONAL FAILURE

MCM attempted to rectify its organizational failure by, first, requesting advice from the Consultative Advisory Forum and, second, embarking on an open policy debate from 2000 to 2001, where stakeholders in the fishery were invited to comment and, third, by reexamining its organizational structures. The fisheries themselves were encouraged to present 'rule books' that were meant to highlight the specific needs, requirements and solutions to the quota share and asset size distribution problem. Most fisheries presented 'rule books' and suggested a graduated redistribution process based on economically viable asset sizes and the 'right of participation' applied in the case of new quota holders to Black fishers or Black individuals involved in the fishing industry. A notable absence of 'rule book' submissions was from the deepsea hake trawl fishery and the inshore trawl fishery (both dominated by early monopsonistic capital, see chapters 6 and 7).

MCM, however, decided to largely ignore the 'right of participation' recommendations from most of the fisheries' rule books and chose instead to adopt the advice that the Consultative Advisory Forum gave in the first place. It chose to limit the 'right of participation' across all fisheries (including the newly created limited commercial quota shares) to entrepreneurs or fishers who can demonstrate business ability. It also, championed by Bross (2002) of the Deep-Sea Trawling Industry Association[4], dropped the idea of setting a minimum viable asset size. In fairness to MCM this was probably also a result of not having the economic data to work out minimum asset sizes for each vessel group in each fishery. The idea of replacing fishers with entrepreneurs also removes, to some extent, the necessity to set minimum asset sizes—processing or marketing companies make do with their allocation and get others to fish for them, or entrepreneurs simply form joint ventures,

[4] This indicates a turn-around from Penzhorn's (2000) estimate at 1000 tons minimum viable asset size for the deepsea hake trawl fishery.

or fishing concerns lease quota share from other quota holders. The monopsonistic bias was therefore entrenched by a simple adjustment to the first operational rule. Namely, the 'right to participate' was biased toward business skills and away from fishing skills.

The readjustment of the 'right to participate' also probably knocked out the chances of most *bona fida* fishers, particularly from marginalized fishing communities, participating in the micro to small vessel fisheries, to take part legally in those fisheries. This bias against these particular fishers was further enhanced by MCM's regressive application fee. Applicants for quota shares of small asset sizes paid up to 700 times more per ton than the large corporate fishing companies. In other words, MCM also created strong biases against micro, small and medium fishing enterprises. Finally, MCM started to encourage the idea of what it called 'internal transformation' where fishing corporations could readjust their racial distribution in employment, while relying on the capital market to effect the redistribution of fishing capital. These factors all enhance the idea of a monopsonistic, or vertically integrated, bias running through the policy decisions.

In an attempt to correct for administrative incapacity, MCM (in a move that seems similar to an expanded quota board which the policy makers had abolished four years earlier) appointed external and objective consultants to verify and adjudicate all applications for individual fishing rights. After the four-year medium-term individual fishing rights were awarded[5], the Minster of Environmental Affairs and Tourism declared that the whole process was "...a huge success in black economic empowerment" (in Hersoug, 2002:212). During 2003, MCM, satisfied with its progress, believing it has overcome its organizational failure and been contributing significantly to black economic empowerment, changed its concerns to the issues of, first, when should free trade in quota shares be allowed, and, second what should be the term of rights be in the next round of quota share distribution (Kleinschmid, 2003).

[5] Two-year individual fishing rights were awarded in the abalone fishery.

The world experience and economic logic both illustrate that tradable rights will result in a concentration of the TAC into fewer hands and will become entrenched if long-term rights are allocated. This simple observation points to the fact that MCM thinks that it can in four years effectively wipe out a very long history of racial repression in South Africa. MCM believes achieve this normalization by instituting, as a single event, an allocation of medium-term quota shares with i) strong biases against fishers and seemingly marginalized fishing communities, ii) strong biases against micro, small and medium fishing enterprises, and iii) with no developmental back-up to speak of. In other words, MCM must believe that its best strategy is to create biases in favour of vertically integrated corporate fishing companies (it knows that a concentrated industrial organization within the flexible system of individual fishing rights worked in the past) and then passively wait for a black capitalist class to develop through the capital markets and so take ownership of fishing capital.

With regard to the evidence, the general conclusion must be reached that MCM has reverted back to the 1970s style of fisheries management (when quota management systems were first introduced in South Africa) based on the initial evolved structure of individual fishing rights. When evaluating this passive 'event' management strategy in relation to a black economic empowerment (strong redistribution) policy stance, a number of broad[6] questions have been dealt with in the thesis, namely:

a Based on the global experience, are distribution issues in fisheries important?

b Does MCM's strategy work best when applied across the board to all fisheries, or should fisheries be treated separately based on their specific characteristics?

c Are policy alternatives available that can more actively achieve strong redistribution goals without having to sacrifice marginalized fishing communities and micro, small and medium fishing enterprises?

d Finally, is the policy adopted by MCM merely an attempt to correct for its own organizational failure?

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[6] A thorough and complete analysis of the policy and its effects on the various fisheries can only be provided with detailed studies on each fishery. As no economic analysis—apart from a few bioeconomic studies that simple adjust the MSY to MEY—has been undertaken in any of the fisheries, claiming a fully analysed solution would be dishonest.

The answer to the first question is made quite clear in chapters 2 and 3; most fishing countries design their systems of individual user rights and implement them in such a way as to protect the fishers' and vessel owners' claims to the economic benefits derived from fishing. Where these claims are not protected, for example in the European Union's Common Fisheries Policy and the Maori claims to the New Zealand fisheries, efforts are made to adjust the institutional structures accordingly. In the transition economies, small vessel fisheries were privatized to fishers relatively successfully, but not so in the medium to large fisheries—large capital investments require a capitalist class first.

The similarities and differences between the fisheries, based on chapters 1, 5, 6 and 7, are combined and compared in a summary in the following section. The aim is to illustrate that the important commercial fisheries all have specific characteristics. The summary also shows that MCM, and the organizational and institutional bodies before it, used different approaches to redistribution. The final two issues on policy and MCM are discussed within the framework of chapter 4 and within the context of the thesis as a whole in section 8.5.

8.4 THE IMPORTANT TAC FISHERIES

The issue of whether or not each fishery should be treated separately depends on the differences and similarities between them. First, the differences in the fisheries (as is illustrated in chapters 1, 5, 6 and 7) are technological. Each fishery utilizes specific technology depending on where the species being harvested occur within the ocean environment. Generally, the closer the targeted species are to the shore, the lower the access costs and the greater the claim individual fishers have to the resources, for example, those fishers using micro to small vessels in the abalone and west coast rock lobster fishers. Access costs increase the further out to sea the targeted species occur. With a progressive increase in access costs, the claim to the resource moves from

medium-sized vessel owners[7] (who usually employ fishers) to large companies that can cover the high but lumpy costs of operating large vessels[8].

Second, the similarities are usually those designed by humans or have evolved out of human systems, that is, they are politically determined and economic by nature and can therefore be adjusted to suit certain circumstances. The first set of similarities has been determined by the evolution of the fisheries management system, namely, i) they are all managed according to a TAC constraint, ii) all face a dual system of individual fishing rights, iii) quota shares are allocated by the state, as a portion of the TAC, to individuals or companies, iv) access to the fishing grounds is granted to owners of appropriate fishing vessels and v) all face the same operational rules that make up the structure of individual quota shares (see figure 8.2). These are dealt with in the next section. The second set of similarities is more general in nature, that is, all fisheries face, along with the rest of the South African economy, a history of political and economic discrimination. In the fishing sector this is manifested as i) a racially-biased skills base, ii) a racially-biased distribution of fishing capital, iii) some degree of corporate control over both the resource rent (as a portion of the TAC) and the fishing capital and iv) a marginalization of coastal communities, particularly those of African and mixed origin[9].

Within the data constraints, the thesis has provided a number of indicators for each of the fisheries studied. These include i) indicators of the fleet characteristics of each fishery, ii) an indicator of fishing capacity and information management requirements, iii) indicators of the extent to which the TAC has been redistributed[10] and the quota share base expanded and under what institution these occurred, iv) an indicator that measures the absorption of Black fishers into the skills base, v) a tentative indicator of

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[7] For example, vessel owners (usually holding vessel quotas) in the pelagic and inshore fisheries are part of this group. MCM targeted the hake long-line fishery as one suitable for Black economic empowerment but did not link the medium-sized vessels to a minimum asset size.

[8] The deepsea hake trawl and south coast rock lobster fisheries fall into this category where normally vessel quota is also awarded, but this is not necessarily the most efficient option.

[9] The extent to which some coastal communities have been marginalized and the strategies their members have used with regard to fishing in attempts to enter the formal economy is studied by Isaacs & Hersoug (in Hersoug, 2002).

[10] Due to data constraints, the racial distribution of fishing capital and the resource rent was not measured—MCM itself is unaware of the racial distribution of the quota shares it allocated, let alone the racial distribution of capital (Adams, 2002:pers comms)

the potential for changes in fishing capital (access rights) and v) a measure of corporate control over both the resource rent and fishing capital. These indicators are presented, by fishery, in table 8.1 below.

Table 8.1: Fishery indicators from chapters 5, 6 and 7.

	Micro to Small		Medium					Large	
	Abalone	WCRL[i]	Pelagic			Inshore Trawl		DSHT[ii]	SCRL[iii]
			Anchovy	Pilchard	Bait	Hake	Sole		
Fleet characteristics									
Ave vessel length	5.2m	10.5m	25m		23m	22m		48m	51m
Average age (years)	17y	30y	23y		23y	24y		25y	25y
Number of vessels	47	170	45		36	30		60	9
Number of fishers	229	1693	475		523	378		2085	265
Fishing capacity and information management									
Vessels (V)	47	170	45	45	36	30		60	9
Quota Shares (QS)	39[a]	189[a]	48	76	32	13		31	16
V-QS	8	-19	-3	-31	4	17		29	-7
New quota holders									
% Quota Shares	88%	86%	81%	91%	34%	34%	36%	61%	75%
% TAC	51%	43%	66%	59%	35%	28%	42%	14%	32%
% Asset size[b]	22%	17%	46%	14%	103%	19%	144%	11%	28%
Quota share (QS) implementing institution									
BroadeningQS base	MLRA	IQB	IQB		QB	MLRA		QB/IQB	MLRA
Redistribution QS	MLRA	MLRA	MLRA		MLRA	MLRA		IQB/MLRA	MLRA
Skilled fishers									
Composite index	50%	38%	33%			28%		59%	37%
Changes in fishing capital from 1992									
% New entrants[c]	21%	40%	36%		50%	30%		15%	67%
Corporate Control									
% Fishing capital	0%	21%	62%		36%	67%		88%	77%
% Resource rent	41%	47%	35%	43%	40%	72%	61%	79%	73%

[i]: west coast rock lobster, [ii]: deepsea hake trawl, [iii]: south coast rock lobster

[a]: Limited commercial quota shares are not included, [b]: the average asset size of new quota holders as a percentage of the average asset size of original quota holders, [c]: new entrants who bought or leased fishing vessels since 1992

The fleet characteristics provide the average length of the vessels in each fishery, thus justifying its categorization. The average age of the fleet in the medium to large fisheries ranges between 23 to 25 years. The apparent elderly nature of the fleet is interpreted in chapter 2 as either i) because re-investment is slow due to the short-term nature of the individual fishing rights, or more likely ii) because most vessels are purchased second hand at discounted prices from the subsidized developed world fleets (Bross, 2001: pers comms), coupled with the quasi-rents inherent in very specific assets[11].

[11] In fact, the age of the fleet was of concern at least 40 years ago (see chapter 2).

The next category is fishing capacity and information management. In section 8.2 information management has already been discussed in relation to efficient fisheries management systems. However, also impacting on the ability to manage fisheries efficiently is how the fisheries management plans deal with the fishing capacity of the fleet. Overcapacity, as discussed in chapter 3, is perhaps one of the most worrying problems facing the sustainable use of the world's fisheries today. A simple indicator of the potential for overcapacity (and thus also potential inefficiencies in the fisheries management systems) is the difference between the number of quota shares and the number of vessels operating in the fishery. This is based on Plasket (2002) who indicates that it is possibly unconstitutional to prevent an individual with a quota share from purchasing and operating a vessel and harvesting their allocation. This assumes that if no one company owns more than one vessel (which is not a reasonable assumption for the South African TAC fisheries, therefore the indicator is a very conservative one) then the west coast rock lobster, anchovy and pilchard, and south coast rock lobster fisheries face potential overcapacity problems.

The next set of indicators deals with characteristics of new quota holders in the various fisheries. The effective redistribution, if first measured by the percentage of new quota holders out of all quota shares issued, provides a very favourable result for all the TAC allocations except bait and inshore hake and sole. The generally accepted racial demographic division between Black and White in South Africa is 80:20. Based on the percentage of quota holders, all TAC allocations, except the inshore trawl and large vessel fisheries, have exceeded their redistribution targets[12]. However, when redistribution of the TAC (resource rent) is measured as a percentage of the TAC the indicators provide less significant results. Only in abalone and anchovy and pilchard is 50% or more of the TAC redistributed to new quota holders. For the other fisheries, between 40% and 50% of the west coast rock lobster and inshore sole TACs have been redistributed, bait and south coast rock lobster between 30% and 40%, inshore hake between 20% and 30% and finally deepsea hake trawl 14%.

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[12] It is probably based on this indicator that the Minister in 2002 announced the 'huge success in black economic empowerment' and MCM turned its attention to issues that should bring stability into the fisheries, namely freely tradable long-term individual fishing rights.

A significant indicator of resource rent redistribution links the asset size to the quota share—the final indicator on new quota holder characteristics. The '% asset size' indicator in table 8.1 measures the average asset size of new quota holders as a percentage of the average asset size of the original quota holders. The unfavourable result for bait and inshore sole, when measured as a percentage of new quota holders of quota shares, is reversed. The average asset size awarded to new quota holders in both these fisheries is larger than the average asset size of the quota shares held by the original quota holders. However, for all the other fisheries, the '% asset size' indicator is lower than any of the other indicators. The general conclusion, except for bait and inshore trawl, is that although the number of quota shares awarded to new quota holders has increased and looks impressive, the reality of the situation is that this translates into a rather disappointingly low redistribution of the TAC, coupled with smaller asset sizes being awarded to new entrants. Bearing in mind that these indicate only a redistribution of the resource rent, the results clearly do not indicate a huge success for black economic empowerment.

The institutions in the history of South African quota management responsible for broadening the quota share base are the Quota Board (from 1990 to 1994), the Interim Quota Board (from 1994 to 1998) and the Marine Living Resources Act of 1998. The Quota Board's main task was to broaden the quota share base, which it did for the bait and deepsea hake trawl TACs. The Interim Quota Board was more racially representative and its task was to broaden the quota share base and distribute quota shares to new Black quota holders (redistribution). The Interim Quota Board broadened the quota share base by adding new quota holders in the west coast rock lobster, anchovy and pilchard, deepsea hake trawl and south coast rock lobster fisheries. The quota share allocation institutions under the Marine Living Resources Act of 1998 increased the quota share base in the abalone and south coast rock lobster fisheries. It also, however, redistributed quota share from existing quota holders to new quota holders in all the fisheries discussed. During the last quota share distribution round in 2001, the quota share base was decreased in the abalone, west coast rock lobster, deepsea hake trawl and south coast rock lobster fisheries, and increased in the inshore trawl fishery, and held constant in the pelagic fisheries[13].

[13] These results are not shown in table 8.1, but are also available as a time series in chapter 5, 6 and 7.

The composite indicator provides an idea of the absorption of Black skilled fishers into the various fisheries and is calculated as follows: the percentage of skilled Black fishers employed in the fishery is adjusted by a demographic parameter and weighted by the racial income difference. Provided of course that fishers are important in the 'right of participation' (in fact they take second place, after the entrepreneur with business skills), then from a strong redistribution point of view, the composite indicator gives an indication of an upper bound to black economic empowerment in the fishery. Only the abalone fishery and the deepsea hake trawl fishery have absorbed more than 50% of skilled fishers into their structures. All the others fall between a low of 28% (in the inshore trawl fishery) and a high of 38% (in the west coast rock lobster fishery). The high score in the deepsea hake trawl fishery is probably because the large fishing companies can better afford to train their fishers. However, the same fishing corporations which dominate the deepsea hake trawl fishery, as is illustrated in chapter 6, also dominate the inshore fishery, that is, they have both the highest and lowest absorption rates. If these indicators are representative of what MCM calls 'internal transformation', then based on the fact that the fisheries have had since 1994 to normalize their racial skills distributions, 'internal transformation' still has a way to go (these indicators are adjusted for racial demographics and a score of 100% indicates a normal skills balance between Black and White in the fishery).

The changes in ownership[14] of fishing vessels with applicable access rights to specific fisheries is by no means a good indicator of fishing capital redistribution, but it is the best possible one given the data constraints. It can provide a point from which to gauge the 'natural' rate of fishing capital transfer relative to the size of the fleet. For the purposes of this thesis, and in the absence of a better indicator, these values can be seen to place an upper bound on the ability to achieve a redistribution of fishing capital. If compared to the composite skills indicator, this indicator would bind only the abalone and deepsea hake fishery to below that indicated by the absorption of Black skilled fishers into their respective fisheries. In other words, to achieve black

[14] This includes changes in chartering fishing companies.

economic empowerment, the development of Black skilled fishers is generally more important.

The level of corporate control of the fishing capital and the resource rent is expressed, in table 8.1, as the percentage control of the fleet and the percentage control of the TAC respectively. First, the abalone fishery is unique in many ways (chapter 5), the processing and marketing companies sub-contract owners of micro vessels to harvest portions of their TAC—a classical state-sanctioned monopsonistic situation. Second, corporate control in the small-vessel west coast rock lobster fishery is marked by a higher control over the TAC than fishing vessels. This could be a result of the corporate fishing companies owning on average larger fishing vessels, or it could point to the incidence of state-sanctioned monopsonistic, or oligopsonistic, processing and marketing establishments. The history provides some evidence for the latter view (see chapter 2). Third, the medium-vessel pelagic fishery and the inshore trawl fishery show different patterns. The pelagic fishery, corporate control of the fishing capital (vessels) is larger than their control over the TAC. This probably means that corporate fishing companies, having accumulated fishing vessels by vertically integrating, now lease quota shares from some of the new quota holders (called the 'paper quota' problem). In the inshore trawl fishery, which is dominated by the same fishing companies that dominate the deepsea hake fishery, displays a more or less equal control of the TAC and the fishing capital. Finally, in the large vessel fisheries, as would be expected, corporate control over both the resource rent (TAC) and the fishing capital (vessels) is very high.

Finally what is clear from the table 8.1 and the above summary, is that although all the fisheries face similarities in terms of the fisheries management system, the technological and access cost differences mean that i) they have been treated differently, particularly under the three distribution institutions, ii) they have reacted differently and iii) they should all ideally be treated as distinct fisheries in future.

8.5 POLICY OPTIONS

Fisheries redistribution policy in South Africa has definitely not led to a huge success in black economic empowerment (strong redistribution). MCM's first approach was

passive in that it simply broadened the quota share base[15] by dividing the resource rent (TAC) into smaller and smaller asset units. Thereafter, the racial distribution of fishing capital and fishing skills was left to the market. This obviously failed[16]. MCM's new approach is active in that i) it is applied across the board in all fisheries, ii) it discourages black economic empowerment (strong redistribution) among fishers in poorer fishing communities and iii) it has created strong biases against black economic empowerment in micro, small and medium enterprises. With large vertically integrated fishing companies controlling the fishery, MCM can now passively wait for capital markets to fix their black economic empowerment problem. In other words, its passive faith in markets has moved from the market in general to the capital market in particular. Also, its current concerns about fishing capital re-investment are not a strong enough justification for entrenching (by applying freely tradable long term individual fishing rights) the strong biases against fishers, fishing communities and micro, small and medium enterprises.

The reason why MCM reverted to a late 1970s to early 1980s approach to fisheries management is based on the observations that, i) a concentrated fishing industry was at this time easy to control and MCM could get on with what it does best, namely marine science and oceanography (disciplines in which South Africa developed a world reputation during political and economic isolation) and ii) this seemed, based on previous experience, a good solution to the organizational failure of MCM[17]. In other words, MCM was more concerned about its organization failure than it was about redistribution and racial normalization. On the other hand, whether or not MCM has the capacity or the will to address the black economic empowerment problem by adopting an active developmental approach, as opposed to a passive event management approach with a misguided faith in the market, is uncertain. It does however have some powerful instruments at its disposal that could be better used in this attempt.

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[15] Redistribution is not mentioned here for the specific reason that MCM itself does not know the racial distribution of the benefits from the resource rent.

[16] See appendix A—The position of national government is that economic growth and the current phase of globalization, that is, markets, tend to exacerbate the marginalization of those who lack assets, skills and access to markets (RSA, 2003:4,11) and without corrective intervention, this state of affairs will result in social and political instability as the marginalized black majority becomes worse off (RSA, 2003:5.4).

[17] This is consistent, in some ways, with van Sittert's (2003) big business big science hypothesis.

First, no matter what approach MCM adopts, it should not view vertically integrated fishing companies as necessarily bad. In fact, they could be efficiency-enhancing and should in most cases be encouraged, but only if the market is allowed to operate. Power to control raw fish prices, whether monopsonistic or monopolistic, may result in abuse and should be discouraged. The Competition Act of 1998 was promulgated to deal with these cases[18]. Fundamentally, MCM should not be involved in activities that can operate successfully within a market system. Because the allocation of fishing rights and the enforcement of harvesting limits are where the market fails, MCM should stick to these functions. In other words, MCM has no business licensing fish processing establishments[19] where the discipline of the market can work. These are better controlled through other departments, for example, health or trade and industry. It could encourage vertical integration in micro, small and medium fishing concerns by, for example, providing extension services and the business training it values so highly. This, however, requires an active developmental approach.

Assuming that MCM concerns itself only with the allocation of quota shares and the enforcement of harvest limits, then it has at its disposal a number of instruments that can be used to create biases in favour of strong redistribution. Assume further that its primary goal is to efficiently and actively pursue black economic empowerment strategies (strong redistribution) in the fishery[20]. Based on these assumptions, MCM needs to design a system of individual fishing rights that i) takes into consideration the specifics of each fishery and ii) results in a fisheries management system that requires a reduced amount of information to implement and enforce, that is, it must be

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[18] If a fishing concern believes that a monoposonistic processing or marketing company is abusing its power by offering less than a fair price, it should deal with this problem through the Competitions Commission and vice versa for monopolistic control over raw fish prices. Final seafood prices are also subject to the Competition Act, but should, if abuse is suspected, be brought forward by consumer or retail organisations.

[19] When dealing with factory vessels that process fish at sea, all that is needed is to enforce a harvest constraint on the vessel in exactly the same way as with other fishing vessels. The Diemont Commission first made this recommendation (see chapter 2).

[20] These are not unrealistic assumptions.

less flexible. In addition, its revenue collection instruments discussed in chapter 3 should not create unwanted or unintended distribution biases[21].

The fundamental operational rule is the 'right of participation'. From here all the other operational rules are designed to either create more flexibility or less flexibility. For systems' efficiency the ability to monitor with the least amount of information those with 'right of participation' is crucial. There are essentially two 'right of participation' operational rules in South Africa: access rights are limited to vessels and withdrawal rights (quota shares) limited to people with business ability and some interest in the fishing industry. The two have to be joined, usually with increased transaction costs, for fishing to actually take place. Furthermore, quota holders cannot be denied access if they so wish. Obviously this system requires massive amounts of information to be efficient (even without the free trade in quota share) and incurs large coordination costs. Primarily, the two should be joined. The only way to do this is to link the 'right of participation' to either the vessel or the fisher, that is, only individuals who own vessels or have fisher status are allowed to participate in the fishery and hold quota shares. This immediately solves the 'asset size' operational rule problem. It demands minimum asset sizes linked to vessels or other specific fishing activities.

The decision on whether to define the 'right of participation' as fishers or vessels depends on the fishery in question. In this regard, policy opinions for the three groups of fisheries based on vessel sizes are discussed next.

First, those fisheries with low access costs that operate close to the shore are usually strongly aligned with individual fisher activity, typically in fishing communities. The 'right of participation' should be defined according to fisher characteristics in these cases. A strong redistribution strategy would involve, as has been mentioned, extension services and facilitation with finance and business training. Fishery extension services are similar to agricultural extension services; they provide fishers with skills-specific information and training. Primarily, because individual fishing

[21] If, for example, the revenue collection instruments are not neutral they should create biases in favour of the policy prescriptions, assumed here to be strong redistribution (black economic empowerment).

rights have value, the 'length of term' operational rule can be used as one tool to facilitate the fisher's ability to access private finance. It should be noted that the application of this rule is not sufficient in itself; extension and other developmental services should also play a part. From a growth perspective, training fishers in business skills[22] should enable them to take advantage of the efficiency gains by vertically integrating[23]. Here the first assumption is important: MCM should not attempt to regulate the processing or marketing activities. If the market is not characterized by monopsonistic control it can be made to work in favour of strong redistribution. If the 'right of participation' is linked to the fisher, the 'tradability' operational rule is unimportant. In other words, these rights should not be tradable; efficiency gains can be realized through the application of a developmental approach[24], namely extension services and possible vertical integration.

Second, in the medium vessel fisheries, the smallest common denominator is the fishing vessel. Also, as has been illustrated in chapter 6, the vessels operating in these fisheries are characterized by multi-species access rights. The recommendation made by the Association of Small Scale Hake Industries (1999) clearly illustrates the massive social and economic gains available if these fisheries were managed primarily along a multi-species vessel-based plan. The problem here is whether or not the government scientists are capable of translating a number of single species TACs and TAEs into a multi-species resource management plan for the medium vessel fishery[25]. Assuming they can, then fundamentally, the 'right of participation' should be based on the vessel (vessel ownership or access to one), in a similar manner to the Icelandic and Norwegian systems. The bundle of fishing rights, measured as proportions of the TAC and TAE of the multi-species fishery, again should be linked to the vessel. Strong redistribution, although requiring a developmental process (not an event), can be achieved by using extension services and taking advantage of the

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[22] This is approach is more active and equitable than dictating from the centre, namely, that fishers should acquire business skills in order to qualify for right of participation.
[23] This does not necessarily mean international marketing and sophisticated processing and packaging.
[24] A potential conflict is possible if the 'length of term' operational rule is relied on to provide the necessary finance to private fishers and the individual fishing rights are not tradable. This again points to the massively important role that extension services and a developmental approach to strong redistribution play.
[25] The evidence indicates that marine science in South Africa is of a world standard and that they should be capable of this task.

graduated approach and fishing industry assistance suggested in the 'Rule Books' (RSA, 2001g).

Tradability rules for a multi-species medium vessel fishery can be developed by, for example, leasing a certain portion of a vessel quota share to provide some flexibility to encourage technological efficiency gains and trading vessels themselves along with their quota share bundles. A longer duration of term, again if linked to the vessel, does not necessarily work against strong redistribution—vessels, with their quota share bundles can be traded in a beneficial manner, but only if extension services and an active approach to redistribution are adopted by MCM. From a fisheries management efficiency angle, initially the coordination and information costs would be high, but both would substantially fall once the system is in place. It is easier to track vessel trades, or percentage quota bundle trades, than separate trades in vessels and quota shares in the different fisheries. Also, collecting catch data used for setting resource management parameters (TACs and TAEs) would be less costly to enforce with a single structure of fishing rights based on the vessel. The same holds for enforcing the harvest parameters for each vessel.

Third, because large vessels are specific capital assets that require high operational costs in their utilization[26], restricting the 'right of participation' to fishers is not appropriate. The experience from the transition economies (see chapter 3) indicates that a capital class[27] is a prerequisite for these fisheries to operate successfully. Obviously, large fishing companies, facing high risk and uncertainty in deepsea fishing, would want as much flexibility in the system as is possible to achieve their own internal level of efficiency. However, fishing capacity management is important and the dual structure of rights provides too much flexibility in this regard. Negotiations between the major South African fishing corporations and MCM, with regard to linking their quota share to vessels, or some other capacity management plan, is important. The 'term of rights' operational rule is crucial in these fisheries. If the term is too low, fishing companies have an added incentive to harvest more than their quota share, particularly if capacity management procedures are not strictly

[26] This also means that their quasi-rents are high.
[27] In fact, the same argument may be applied to the New Zealand fisheries in the 1980s.

defined or quota shares linked to particular vessels. However, with longer-term rights (the term could be, for example, calculated on some capital depreciation formula[28]) the issue of reinvestment becomes important. If and when companies reinvest, the new vessels will tend to be more technologically efficient and thus also more capital intensive than the older vessels. Devices for adjusting capacity management parameters and the retrenchment or redeployment of fishers are crucial elements for an efficient large vessel fisheries management plan. MCM's 'internal transformation' for strong redistribution seems appropriate in these fisheries.

MCM also has revenue collection instruments at its disposal. It can use these instruments either as economic incentive adjusters or simply to collect revenue. From chapter 3, three basic instruments appropriate to MCM are identified, namely, application fees, quota share pricing systems and harvest levies. First, if application fees are used primarily as a disincentive for opportunistic applicants, they should at least be neutral. In other words, the fee should be based on the asset size the individual applies for, not on a quota share. Second, for quota share pricing, where MCM attempts to capture the resource rent, an iterative pricing system starting with a candidate price per unit of the quota share (therefore dependent on the asset size) might work within the implementation capacity of MCM. The first issue is whether or not to allow Black fishers or Black owned vessels a certain portion of the resource rent for free, but, only until these entities are firmly established. This would seem desirable, but if implemented should be subject to a phasing out scheme and other requirements (for example, taking advantage of the extension services). The second issue relates to the oligopolistic industrial structure inherent in many of the fisheries, particularly the deepsea hake trawl fishery and the inshore trawl fishery. Here, iterative pricing might not provide the incentives for the oligopoly to reveal true values. A marginal price might have to be determined through an economic study. Third, harvest levies are best suited to a cost recovery system for research services and the rates can be optimally determined through fishery specific scientific and industry or co-management bodies.

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[28] This was suggested in the Diemont Commission.

Finally, when putting the policy recommendations together, the outcome must result in an information-efficient fisheries management plan with strong redistribution and, preferably, not too much of a burden on the National Treasury. Adopting a development orientated approach to the micro and small vessel fisheries, by removing the dual structure of individual fishing rights and adding extension services, the informational requirements would become localized to the extension officers. This result is similar in many respects to the co-management schemes suggested by the sociologists, most importantly Hersoug and Isaacs (2003). For the medium-vessel fisheries, specific information, perhaps delineated on geographical or some other appropriate measure, will develop with the fisheries manager. In both these cases, the massive information requirements of the yearly quota share allocation process are removed—reallocations only need to be instituted when a fisher, or vessel, leaves the fishery. For the large vessel fisheries, MCM's major function would be to set the TAC, manage capacity, closely monitor 'internal transformation' and collect sufficient revenue from these fisheries to finance their extension and development activities (or at least part of them) in the smaller vessel fisheries.

The difficulty comes in identifying correctly the *bona fide* Black fishers or potential Black vessel owners in the micro, small and medium fisheries. The evidence from chapter 6 and 7 also indicates that fishing skills are a binding constraint. Intervention in both fishing and business skills training is obviously a necessity. In fact, many of the fishing industry 'rule books' indicated willingness on behalf of the private White fishers and vessel owners to identify potential Black fishing entrepreneurs and to assist in fishery-specific training and mentorship programmes. Most White fishers and boat owners expect the eventual inevitability of strong redistribution and rather than be forced into bankruptcy (through, for example, reallocations of quota shares), it makes sense to assist in an orderly process where Black new entrants could buy their vessels, or businesses, at market prices—a typical win-win situation. However, as is illustrated in this thesis, it requires more than just the will from the private sector. For this to be successful, it is suggested that the government (MCM) should facilitate the process by i) changing the structure of individual fishing rights on a fishery-by-fishery basis, ii) adopting a developmental, as opposed to a control and an event management, approach, and iii) using their revenue collection powers more effectively.

8.6 CONCLUSION

The purpose of the thesis has been achieved. The thesis has provided theoretical and some empirical evidence that assists in understanding fisheries policy from an institutional and system's efficiency point of view. The factors that led to the organizational failure of MCM, and attempts at correcting for this, are explained within an historical context. With a focus on the structure of individual fishing rights and efficient fisheries management systems, the major commercial TAC fisheries are examined within the categorization developed in chapter 1. Finally, policy opinions are offered with regard to each category based on vessel length. However, to create efficient fisheries management plans and achieve strong redistribution, each fishery must be treated on its merits and evidence compared to the fisheries management plans of other fisheries and fisheries policy in general. The formulation of these fisheries management plans is unfortunately beyond the scope of the thesis. However, the thesis does provide a broad framework from which to start and is a first step in the correct direction when attempting to achieve strong redistribution and systems efficiency, that is, minimizing the trade-off between equity and efficiency (including stability).

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APPENDIX TO:

FISHING RIGHTS, REDISTRIBUTION AND POLICY: THE SOUTH AFRICAN COMMERCIAL T.A.C. FISHERIES

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APPENDIX A1: Policy Principles

The fundamental policy principles followed are:

a Fisheries policy is founded on the fundamental environmental right entrenched in the constitution of South Africa, that *"[e]veryone has the right ...to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that... secure ecological sustainable development and use of natural resources while promoting justifiable economic and social development"* (RSA: 1996).

b That all marine living resources, and the environment that they live in, are national assets and that the fisheries authority (MCM) is the custodian of these assets and should be guided by the Marine Living Resources Act of 1998.

c That Black Economic Empowerment is crucial for the stability and health of the fishing industry and that MCM has a fair degree of leverage over this process. (RSA, 2003)

Point b) has implications for the structure of rights, for example, the inheritability of a quota share is questionable as it, in essence, transforms a national asset into a private asset. The third fundamental is based on the fact that, as a result of non-market social intervention[1], the South African economy is characterized by entrenched racial inequalities in the distribution of wealth, income, skills, and employment opportunities. Furthermore, the position of national government—that economic growth and the current phase of globalization, that is, markets, tend to exacerbate the marginalization of those who lack assets, skills and access to markets (RSA, 2003:4,11)—is adopted. Also, without corrective intervention, this state of affairs will result in social and political instability as the marginalized Black majority becomes worse off[2] (RSA, 2003:5.4).

[1] "The structured exclusion of black people from economic power began in the late 1800s with the first dispossession of land and continued throughout the 20th century with the Mines and Works Act, 1911, the land Act 1913, and that raft of Apartheid laws enacted after 1948" (RSA, 2003:6).

[2] Indeed, the current political, social and economic instability in Zimbabwe may be interpreted as a frustration of its national government to institute economic normalisation in that country.

APPENDIX A2: Consultative Advisory Forum

A2.1: The Association of Small Scale Hake Industries

The ASSHI (1999b) document brings out a number of very important coastal development and redistribution issues, namely:

a) That small-scale fishing concerns are labour intensive and a redistribution of the TAC in favour of these concerns would more than make up for the job losses in the vertically integrated corporations.
b) Small-scale fishing concerns are geographically widely distributed, redistribution in their favour would spread the benefits from the fisheries more broadly. Hersoug (2002:22) states "95 percent of the fishing is done by vessels owned and operated from the Western Cape and in particular Cape Town". This, as is mentioned above, would have a large impact on poverty in the poorer coastal communities.
c) The creation and support of small-scale black fishing concerns is a good mechanism to institute a meaningful black economic empowerment.

Further it has important implications for the design of a fisheries management system:

a) The idea of a minimum asset size is changed from defining it as a single species quota share to a bundle of quota shares from different species, probably dependent on the size and type of fishing vessel used. The example provided is for the hake long-line fishery[1], a minimum asset size of 710 tons per vessel as a single species quota share is needed for a viable vessel, but when combined with other species and fished only during the stormy winter months it could be reduced to 100 tons (ASSHI, 1999b:3).
b) Because the fishing vessel is central to the management equation, the important issue of harvesting over-capacity, or capacity-management, is addressed as a natural consequence.

The position of the small-scale operators provides a holistic approach to fisheries management that confronts not only the major problems facing all fishing nations around the world, but also deals intelligently with the major distribution issues in South Africa today.

A2.2 Questions Confronted by the Consultative Advisory Forum

The questions asked of the Consultative Advisory Forum are listed below and reveal the problems that the bureaucrats envisaged with regard to the policy on the distribution of quota shares and effort permits.

From the director general:

1. *"Should we extend the current fishing rights for a further year in some sectors [fisheries] to create space for an orderly introduction of new allocations?*
2. *Would the CAF recommend any fisheries which can be handled on a trial basis under the new policy?*
3. *Which fisheries should be allocated on a multi-year (longer term) basis—how many years?*

How should pricing be structured?

4. *What elements should be priced (application fee, lease fee, landing fee)?*

[1] By increasing the hake long-line TAC, from 10 000,tons to 25 000,tons—this means taking 15 000 tons (or 11% of the 2002 TAC) from the deepsea hake trawl TAC—250 multi-species vessels and nearly 10 000 people can be employed for an additional eight months (ASSHI, 1999:3).

5. *How should the price be set for the above (economic rent, market, administrative cost)?*
6. *Recommend pricing windows to differentiate between applicants of different sizes (big industry, small medium and micro fishing enterprises and subsistence) in the various industry sectors [fisheries].*
7. *What portions of the TAC/TAE should be set aside for each commercial segment [enterprise size] within the different sectors [fisheries].*
8. *How many players are desirable within each sector [fishery] and what should be the time scale over which this transformation [broadening the quota share base and the effort permit base]? [For example, how should the TAC be split between large and smaller fishing companies].*
9. *Criteria for the mechanism for allocation within each sector [fishery].*
10. *How do we define a fishery and what are its linkages? [For example, should fisheries be managed as single species or on a multi-species basis]?*" (CAF, 2000).

From the deputy director general:

1. "*Who do we want to attract to the industry (i.e. in terms of skills base)?*
2. *Issues of transformation [redistribution] need to be properly addressed by the policy and some aspects that should be considered are:*
    - *number of new entrants [new quota holders]*
    - *extent of internal ownership restructuring*
    - *extent of new entrants [new quota holders] through joint ventures*
    - *conditions of employment, i.e. quality of jobs.*" (CAF, 2000)

APPENDIX A3: A Derived Structure of Fishing Company Corporations

A3.1 Introduction

The South African fishing industry is characterized by the consolidation of many of the small fishing companies into a few large vertically integrated companies. These companies are vertically integrated in the sense that they control both seagoing fishing operations, processing or packing and marketing. The companies have developed various strategies to deal with the redistribution of quota shares. All are subject to the Employment Equity Act, which is labelled 'internal transformation' by the fishing industry, all have lost a portion of their quota share, most have established joint venture agreements with newly emerging Black fishing companies and some have simply dissembled.

The consolidated fishing companies are divided into two groups. The first group consists of truly consolidated companies. They are Irvin & Johnson, Sea Harvest, Oceana, Premier Fishing, Foodcorp, Pioneer Fishing and the Saldanha Group (the Viking Fishing Company could also be included in this group). The second group consists of an essentially de-consolidated company, the Lohe Galero Holdings (Lusitania) company. Because all fishing companies, their subsidiaries and associates are tradable, along with their access rights (fishing vessels) and quota share, the exact structure is difficult to determine with certainty.

A3.2 The consolidated fishing companies

Below are derived company structures based on the information provided by Warman (2002:119-160). It is acknowledged, however, that the structure or information might be inaccurate or incomplete. The ordering of presentation also does not indicate a ranking in terms of size.

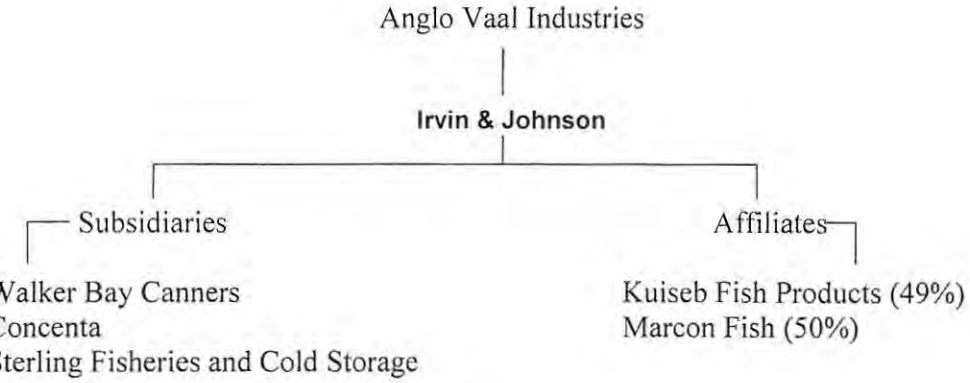


Figure A3.1: Derived company structure of Irvin & Johnson.
Source: Warman (2002:119-160)

Figure A3.2: Derived company structure of Sea Harvest.
Source: Warman (2002:119-160)

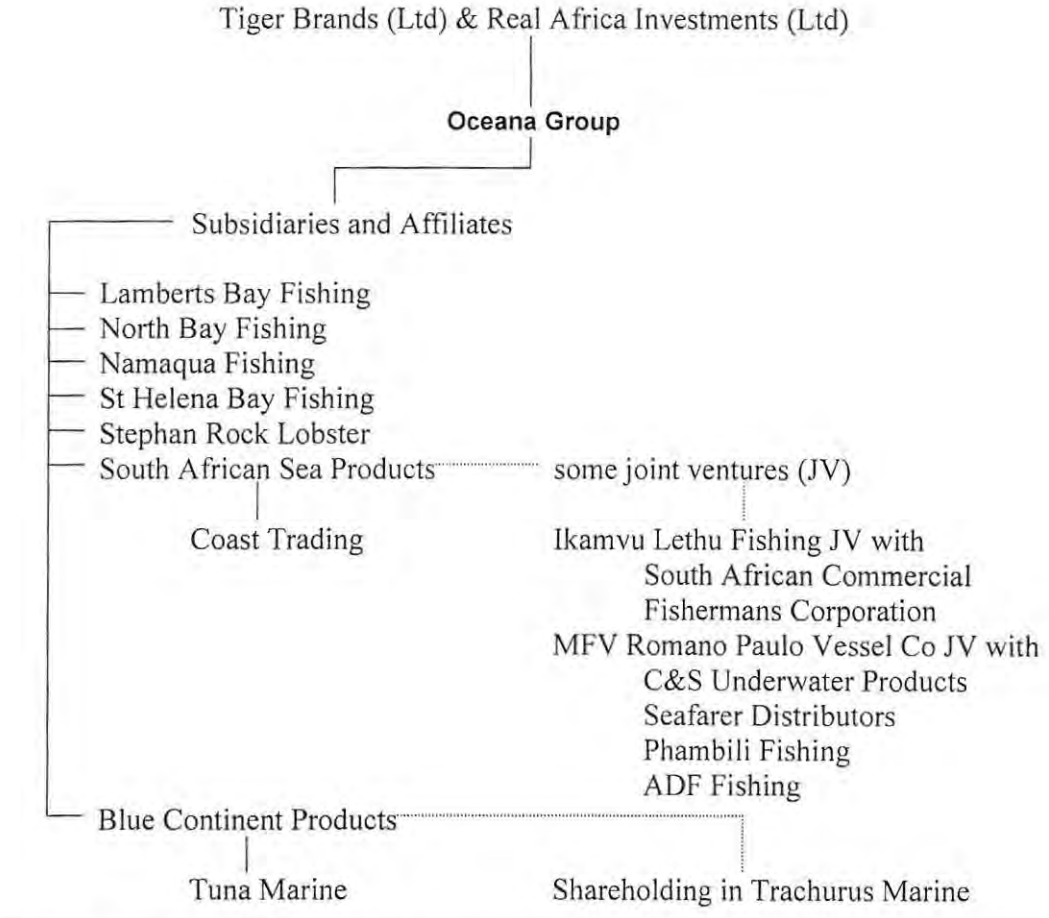


Figure A3.3: Derived company structure of the Oceana Group.
Source: Warman (2002:119-160)

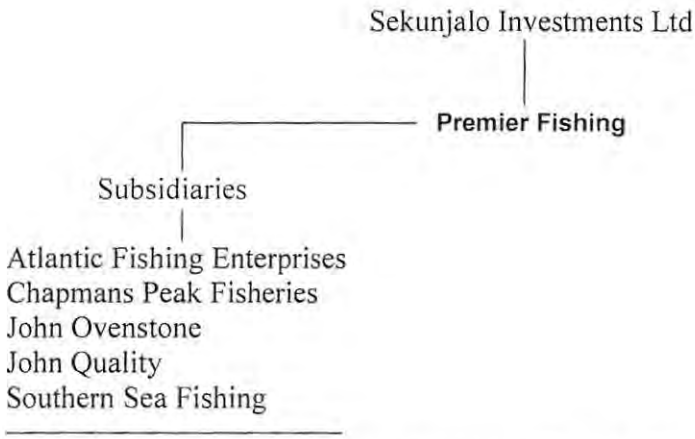


Figure A3.4: Derived company structure of Premier Fishing.
Source: Warman (2002:119-160)

Figure A3.5: Derived company structure of Foodcorp.
Source: Warman (2002:119-160)

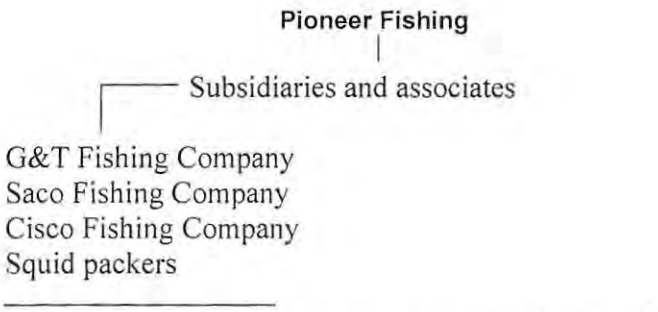


Figure A3.6: Derived company structure of Pioneer Fishing.
Source: Warman (2002:119-160)

Saldanha Group

Subsidiaries and associates

Paternoster Visserye
West Point Processors
Saldanha Bay Canning
King Solomons Foods
Deseeda Sea Products
Eigerlaar

Figure A3.7: Derived company structures of the Saldanha Group.
Source: Warman (2002:119-160)

A3.3 The Lohe Galero Holdings (Lusitania) Fishing Company

The fishing interests of the Lohe Galero Holdings company are the most difficult to determine. The chairperson, Joao Gastao Fernandez[1], built up the Lusitania Food Products company and sold off the assets to Lohe Galero Holdings. The Lohe Galero Holdings company provides services to and controls all aspects of the fishing industry. Its subsidiaries, none of which hold quota shares, are listed below:

Live Fish Tanks (east coast)
Live Fish Tanks (west coast)
V&A Cold Storage
V&A Processing Services
Lusitania Trawling Services (Cape Town)
Lusitania Trawling Services (east coast)
Lusitania Trawling Services (Hermanus)

Perhaps the most interesting subsidiary is Lusitania Management Services, the Black empowerment arm of the Lohe Galero Holdings company. The chairperson, Mr JG Fernandez, the director of transformation Mr BJ Hendricks and Mr GT Boltina the senior manager and chairperson to client transformation and empowerment schemes and enterprises, all sit on the boards of various quota shareholding entities and fishing companies. The ownership of these companies is uncertain, and will for purposes of convenience be labeled as Lusitania Empowerment Companies (LEC). These are listed below (all companies that own vessels declare a 15% shareholding by crew and in some cases a 30% holding by the skipper).

Algoa Bay Sea Products (LEC)
Baratz Fishing Company (LEC)
C&S Underwater products (LEC)

[1] Mr Fernandes has stated his commitment to empowerment initiatives (Warman, 2002:167) and seems to be unique in South Africa in his efforts to empower fishers in this respect. Indeed, many developed fishing countries around the world reserve fishing for the fishers and try to discourage the emergence of 'sea lords'.

Cape Reef Products (LEC) ..... in partnership with ..... West Coast Fishing
Fernpar Fishing Company (LEC)
Hermanus Sea Foods (LEC)
Lobster Island Fishing (LEC) ..... in partnership with ..... West Coast Fishing
Mount Pleasant Fishing (LEC)
Pepper Bay Fishing (LEC) ..... in partnership with ..... West Coast Fishing
Radaco Sea Products (LEC)
Seafarer Distributors (LEC)
South Coast Seas Products (LEC)
Vermont Fishing (LEC)

Mr JG Fernandez also sits on the boards of several other empowerment companies with vessels owned entirely by the skippers, crew and other fisheries workers. These companies, called for convienence the Empowered Lusitania Companies(ELC), are listed below:

Konsortium Kreefbelange (ELC)
Live Rock Lobster Corporation (ELC)
Sparkor (ELC)
Friedman Rabinowitz (ELC)

Furthermore, Mr JG Fernandez sits on the board of a number of joint venture vessel companies. The joint venture partners all have Lusitania Empowerment Companies (LEC) and new quota shareholding companies (indicated below). These arrangements will, for convenience, be called Lusitania Joint Ventures (LJV) and are listed below.

MFV Arizon 2 Vessel Company (LJV)

- Mount Pleasant Fishing (LEC)
- Vermont Fishing (LEC)
- Nomalungelo Fishing—anchovy quota shareholder
- Umzamzi—south coast rock lobster quota shareholder

MFV Emile Adriene Vessel Company (LJV)

- Radaco Sea Products (LEC)
- Pelsrus Historical Fishing Company—chokka squid quota shareholder
- Pimpeno Nineteen—west coast rock lobster quota shareholder
- Impala Fishing ..... affiliated to ..... Jessica Fishing

MFV Helena Marie Vessel Company (LJV)

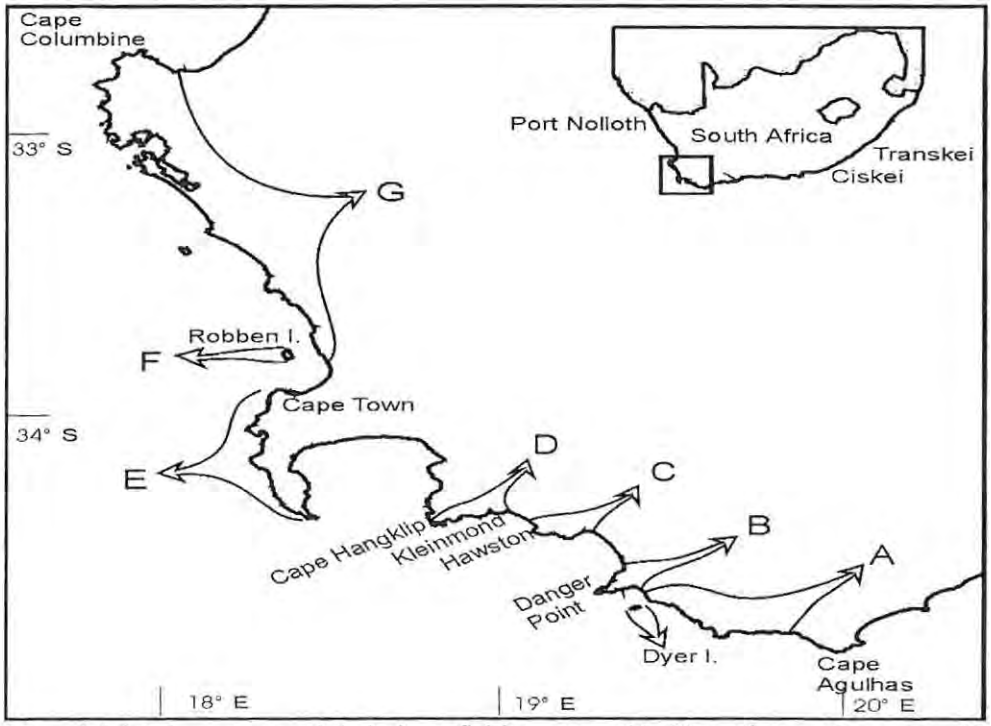
- South Coast Sea Products (LEC)
- Eastern Marine Enterprise—south coast rock lobster quota shareholder
- PJ Oliphant & Partners—south coast rock lobster quota shareholder
- Risar Fishing—south coast rock lobster quota shareholder + others

MFV Romano Paulo Vessel Company (LJV)

- SA Sea Products (Oceana)
- C&S Underwater Products (LEC)
- Seafarer Distributors (LEC)
- Phambili Fishing—hake trawl & south coast rock lobster quota shareholder
- ADF Fishing—south coast rock lobster quota shareholder

The above structures probably reflect to some extent the expanded, or dissembled, company structure of the former Lusitania Fishing Company, but it is also possible that this is entirely incorrect. Also the empowerment function and the way this company targets fishers is entirely in line with most developed fishing countries in the Northern Hemisphere. In fact, this company alone could have had more effect on redistribution than the fisheries authority itself, simply because the fisheries authority concentrates its effort almost entirely on redistributing the resource rent. Therefore, although access rights and quota shares are recorded for concentration and control purposes under this company, care should be taken when interpreting the results.

APPENDIX A4: Abalone



Map A4.1: The commercial abalone fishing zones (A-G) on the south western Cape coastline.
Source: Pulfrich (2001:4)

Table A4.1: The South African abalone products 1991 to 1995.

	1991/92	1992/93	1993/94	1994/95
Canned products (kg)	128 534	128 322	118 959	64 949
Frozen pieces (kg)	19 223	24 023	15 599	14 290
Frozen whole (kg)	4 817	4 220	1 913	1 691
Fresh/live (in shell) (kg)	1 618	12 239	25 211	81 423
Dried(kg)				33
F.O.B* wholesale value (R 000)	26 847	32 777	53 884	54 054

Source: Pulfrich (2000:15)

Between 1995 and 2000, the price for canned abalone varied from US$520 – US$910 per case. For the first time, during 1991, live abalone was exported to the Far East. Since 1996, prices for the live product have fluctuated between US$30 and US$40 per kilogram. Frozen, shucked[1] abalones currently command between US$80 and US$86 per kilogram, while in-shell prices are around US$26/kg. Over the past five years, the price for the dried product has risen steadily from US$200 in 1996 to US$300 in 2000. Because all commercially caught abalone are exported, local restaurants depend solely on abalone supplied by recreational fishers. (Pulfrich, 2001:14-16).

[1] Removed from their shells.

Table A4.2: Summary of the abalone fishery between 1993 and 2002 in terms of fleet characteristics, access rights concentration, quota share distribution and the number of quota shares.

			Fishing season									
			1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Fleet characteristics		Ave length	5.1	5.1	5.1	5.2	5.2	5.3	5.2	5.3	5.2	
		Vessels	60	58	65	58	60	46	59	48	47	
		Fishers	251	250	278	254	262	225	287	235	229	
		Ave fishers	4.2	4.3	4.3	4.4	4.4	4.9	4.9	4.9	4.9	
Concentration of access rights (vessels)	Number of fishing companies		42	40	40	42	39	44	32	43	34	
	Ownership of vessels	Top 3	25%	24%	24%	23%	26%	23%	30%	25%	30%	
		Top 5	32%	31%	31%	29%	33%	30%	39%	32%	38%	
		Top 10	47%	47%	47%	45%	50%	43%	52%	44%	49%	
		Top 15	55%	57%	57%	57%	59%	52%	63%	53%	60%	
	Employment of fishers	Top 3	27%	28%	28%	25%	26%	26%	33%	28%	32%	
		Top 5	34%	35%	35%	32%	35%	32%	42%	35%	41%	
		Top 10	48%	50%	50%	46%	50%	45%	57%	47%	54%	
		Top 15	59%	62%	62%	59%	63%	57%	69%	57%	65%	
Quota share distribution (kilograms)		Total (TAC)	600 000	605 000	615 000	615 000	614 922	550 000	530 000	500 000	371 000	388 350
		Average size	120 000	121 000	102 500	102 500	38 433	25 000	33 125	10 638	7 894	1 832
		Std dev	68 618	69 190	76 703	76 703	61 301	43 230	52 835	20 049	14 877	6 483
		Highest	191 699	193 296	193 296	193 296	173 966	140 942	149 884	87 290	64 770	55 037
		Lowest	35 701	35 999	35 999	35 999	2 000	2 632	1 749	2 000	1 484	430
		Diff high to low	155 998	157 297	157 297	157 297	171 966	138 310	148 135	85 290	63 286	54 607
Number of quota share holders		Commercial	5	5	6	6	16	22	16	47	47	39
		Limited										173
		Total	5	5	6	6	16	22	16	47	47	212

Data source: FIHB (1993 to 2002)

Table A4.3a: Abalone fishery: vessel owner/lessee, number of vessels owned/leased and number of fishers employed (1993 to 1996).

1993			1994			1995			1996		
Vessel owner/lessee	Vessels	Fishers	Vessel owner/lessee	Vessels	Fishers	Vessel owner/lessee	Vessels	Fishers	Vessel owner/lessee	Vessels	Fishers
Gillion	11	45	Gillion	11	44	Gillion	11	45	Gillion	10	41
Otto JGJ	2	11	Henn JW	2	13	Henn JW	2	13	Figaji PAD	3	14
Henn JW	2	11	Cooper RM	1	12	Le Roux JE	2	12	Le Roux JE	2	12
Swart CW	2	9	Swart CW	2	9	Baillie JF	2	9	Henn JW	2	12
Prince WB	2	9	Prince WB	2	9	Prince WB	2	9	Swart CW	2	9
Stewart BA	2	8	Swartz GF	2	8	Swart CW	2	9	Prince WB	2	9
Figaji PAD	2	8	Stewart BA	2	8	Figaji PAD	2	8	Swartz GF	2	8
Okkers WJ	2	7	Figaji PAD	2	8	Hess AJ	2	8	Le Roux JM	2	8
Du Toit IS	1	7	Okkers WJ	2	7	Le Roux JM	2	8	Hess AJ	2	8
Fisher WJ	2	6	Du Toit IS	1	7	Stewart BA	2	8	Okkers WJ	2	7
Le Roux JE	1	6	Otto JGJ	1	7	Swartz GF	2	8	Ama Visserye	1	7
Bailie JF	1	5	Fisher WJ	2	6	Fisher CA	2	7	Du Toit IS	1	7
Botha GA	1	5	Le Roux JE	1	6	Okkers WJ	2	7	Groenewald SJ	1	6
Dynaard LCN	1	5	Dynaard LCN	1	5	Du Toit IS	1	7	Southern Deep Diving	1	6
Kleinsmidt AS	1	5	Kleinsmidt AS	1	5	Otto JGJ	1	7	Bailie JF	1	5
Martin LD	1	5	Maree SJ	1	5	Fisher CJ	2	6	Dynaard LCN	1	5
Windvogel CEP	1	5	Primier Rose Diamonds	1	5	Southern Deep Diving	1	6	Kleinsmidt AS	1	5
Maree SJ	1	5	Windvogel CEP	1	5	Dynaard LCN	1	5	Maree SJ	1	5
Alberts K	1	4	Alberts K	1	4	Kleinsmidt AS	1	5	Primier Rose Diamonds	1	5
Bailie HG	1	4	Bailie HG	1	4	Maree SJ	1	5	Stewart BA	1	5
Burgess JC	1	4	Burgess JC	1	4	Primier Rose Diamonds	1	5	Windvogel CEP	1	5
Dunsdon JT	1	4	De Wet JP	1	4	Windvogel CEP	1	5	Bailie HG	1	4
Fisher CA	1	4	Dunsdon JT	1	4	Alberts K	1	4	Bester JB	1	4
Groenewald AT	1	4	Fisher CA	1	4	Bailie HG	1	4	Botha GA	1	4
Hess AJ	1	4	Groenewald AT	1	4	Botha GA	1	4	Dunsdon JT	1	4
Hess JH (VB)	1	4	Hess AJ	1	4	Burgess JC	1	4	Groenewald AT	1	4
Johnson AP	1	4	Hess JH (VB)	1	4	Dunsdon JT	1	4	Hess JH (VB)	1	4
Kannemeyer EF	1	4	Johnson AP	1	4	Groenewald AT	1	4	Kennedy CR	1	4
Kennedy CR	1	4	Kannemeyer EF	1	4	Hess JH (VB)	1	4	Macfarlane AL	1	4

1993			1994			1995			1996		
Vessel owner/lessee	Vessels	Fishers	Vessel owner/lessee	Vessels	Fishers	Vessel owner/lessee	Vessels	Fishers	Vessel owner/lessee	Vessels	Fishers
Oncker AH	1	4	Kennedy CR	1	4	Johnson AP	1	4	Maree DC	1	4
Potgieter	1	4	Maree DC	1	4	Kannemeyer EF	1	4	Marshall NM	1	4
Raaff GDE	1	4	Oncker AH	1	4	Kennedy CR	1	4	Motades GS	1	4
Swartz GF	1	4	Raaff GDE	1	4	Maree DC	1	4	Nowers JA	1	4
Swartz NP	1	4	Swartz NP	1	4	Matodes GS (96)	1	4	Erwee O	1	3
Le Roux DJ	1	4	Erwee O	1	3	Nowers JA	1	4	Fisher CA	1	3
Maree DC	1	4	Fisher CJ	1	3	Oncker AH	1	4	Fisher CJ	1	3
Erwee O	1	3	Le Roux JM	1	3	Raaff GDE	1	4	Fisher WJ	1	3
Fisher CJ	1	3	Maree NP	1	3	Swartz NP	1	4	Maree NP	1	3
Marshall NM	1	3	Marshall NM	1	3	Erwee O	1	3	Cooke W	1	2
Le Roux JM	1	3	Southern Deep Diving	1	2	Fisher WJ	1	3			
Maree NP	1	3				Maree NP	1	3			
Southern Deep Diving	1	2				Marshall NM	1	3			

Data source: FIHB (1992 to 1997)

Table A4.3b: Abalone fishery: vessel owner/lessee, number of vessels owned/leased and number of fishers employed (1997 to 2000).

1997			1998			1999			2000		
Vessel owner/lessee	Vessels	Fishers	Vessel owner/lessee	Vessels	Fishers	Vessel owner/lessee	Vessels	Fishers	Vessel owner/lessee	Vessels	Fishers
Gillion	9	38	Gillion	9	44	Gillion	10	48	Gillion	9	43
Swart CW	2	15	Swart CW	2	16	Swart CW	2	16	Swart CW	2	16
Figaji PAD	3	14	Figaji PAD	3	15	Figaji PAD	3	15	Figaji PAD	3	15
Henn JW	2	9	Henn JW	2	12	Henn JW	2	12	Henn JW	2	12
Swartz GF	2	8	Swartz GF	2	8	Hess AJ	2	9	Prince WB	2	8
Prince WB	2	8	Prince WB	2	8	Swartz GF	2	8	Otto JGJ	1	7
Hess AJ	2	8	Otto JGJ	1	8	Prince WB	2	8	Henn FJ	1	6
Otto JGJ	1	7	Stewart BA	1	6	Otto JGJ	1	7	Le Roux JE	1	6
Hess JH	2	6	Midnite Visserye	1	6	Du Toit IS	1	6	Midnite Visserye	1	6
Du Toit IS	1	6	Le Roux JE	1	6	Groenewald SJ	1	6	Stewart BA	1	6
Groenewald SJ	1	6	Henn FJ	1	6	Henn FJ	1	6	Bailie JF	1	5
Henn FJ	1	6	Windvogel CEP	1	5	Le Roux JE	1	6	Dynaard LCN	1	5

1997			1998			1999			2000		
Vessel owner/lessee	Vessels	Fishers	Vessel owner/lessee	Vessels	Fishers	Vessel owner/lessee	Vessels	Fishers	Vessel owner/lessee	Vessels	Fishers
Le Roux JE	1	6	Okkers WJ	1	5	Midnite Visserye	1	6	Fisher CA	1	5
Midnite Visserye	1	6	Marshall NM	1	5	Southern Deep Diving	1	6	Hess AJ	1	5
Southern Deep Diving	1	6	Maree DC	1	5	Stewart BA	1	6	JM&MAG Fishing	1	5
Bailie JF	1	5	Kleinsmidt AS	1	5	Bailie JF	1	5	Kleinsmidt AS	1	5
Dunsdon JT	1	5	JM&MAG Fishing	1	5	Dunsdon JT	1	5	Maree DC	1	5
JM&MAG Fishing	1	5	Hess AJ	1	5	Dynaard LCN	1	5	Maree SJ	1	5
Kleinsmidt AS	1	5	Fisher CA	1	5	Fisher CA	1	5	Marshall NM	1	5
Maree SJ	1	5	Dynaard LCN	1	5	JM&MAG Fishing	1	5	Okkers WJ	1	5
Primier Rose Diamonds	1	5	Nowers JA	1	4	Kleinsmidt AS	1	5	Raaff EA	1	5
Stewart BA	1	5	Motades GS	1	4	Maree DC	1	5	Sea Plant Products	1	5
Windvogel CEP	1	5	Maree NP	1	4	Maree SJ	1	5	Windvogel CEP	1	5
Bester JB	1	4	Kennedy CR	1	4	Marshall NM	1	5	Bailie HG	1	4
Botha GA	1	4	Hess JH (VB)	1	4	Okkers WJ	1	5	Daniels A	1	4
Daniels A	1	4	Fisher WJ	1	4	Primier Rose Diamonds	1	5	Erwee O	1	4
Dynaard LCN	1	4	Fisher CJ	1	4	Raaff EA	1	5	Fisher CJ	1	4
Groenewald AT	1	4	Erwee O	1	4	Windvogel CEP	1	5	Fisher WJ	1	4
Kennedy CR	1	4	Daniels A	1	4	Bailie HG	1	4	Hess JH (VB)	1	4
Macfarlane AL	1	4	Bailie HG	1	4	Bester JB	1	4	Kennedy CR	1	4
Maree DC	1	4	Le Roux JM	1	3	Botha GA	1	4	Maree NP	1	4
Motades GS	1	4	Dyer Island Visserye	1	2	Daniels A	1	4	Motades GS	1	4
Nowers JA	1	4				Erwee O	1	4	Nowers JA	1	4
Okkers WJ	1	4				Fisher CJ	1	4	Le Roux JM	1	3
Bailie HG	1	3				Fisher WJ	1	4	Dyer Island Visserye	1	2
Erwee O	1	3				Groenewald AT	1	4			
Fisher CA	1	3				Hess JH (VB)	1	4			
Fisher CJ	1	3				Kennedy CR	1	4			
Fisher WJ	1	3				Maree NP	1	4			
Le Roux JM	1	3				Motades GS	1	4			
Maree NP	1	3				Nowers JA	1	4			
Marshall NM	1	3				Le Roux JM	1	3			

1997			1998			1999			2000		
Vessel owner/lessee	Vessels	Fishers	Vessel owner/lessee	Vessels	Fishers	Vessel owner/lessee	Vessels	Fishers	Vessel owner/lessee	Vessels	Fishers
Raaff EA	1	3				Dyer Island Visserye	1	2			

Data source: FIHB (1998 to 2001)

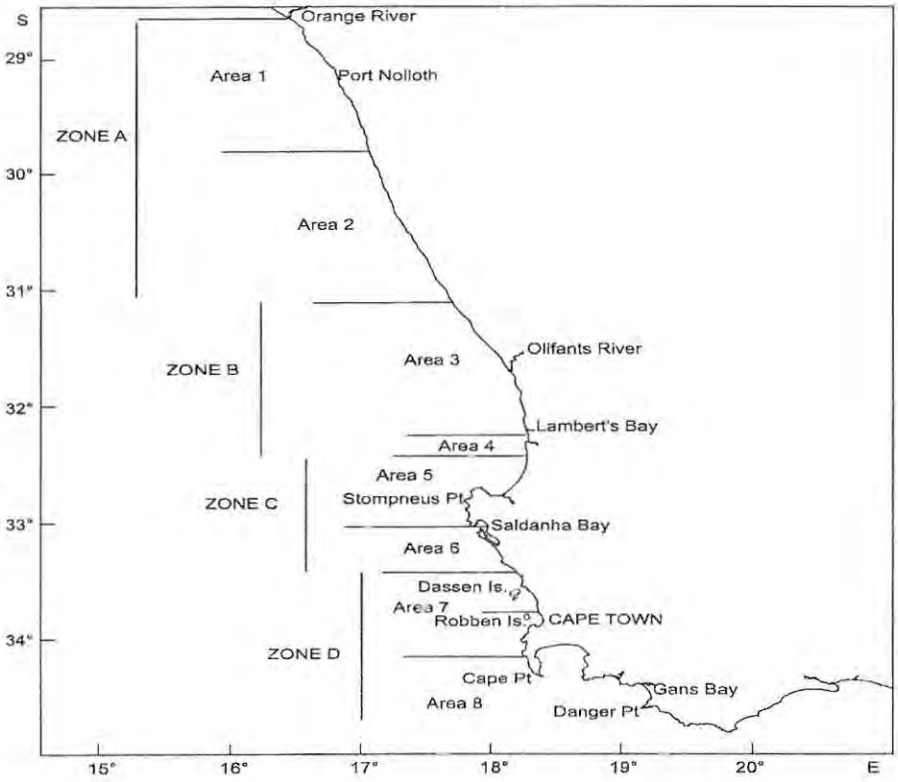
Table A4.3c: Abalone fishery: vessel owner/lessee, number of vessels owned/leased and number of fishers employed (1997 to 2000).

2001		
Vessel owner/lessee	Vessels	Fishers
Gillion	9	43
Swart CW	2	16
Figaji PAD	3	15
Henn JW	2	12
Prince WB	2	8
Otto JGJ	1	7
Henn FJ	1	6
Le Roux JE	1	6
Stewart BA	1	6
Bailie JF	1	5
Dynaard LCN	1	5
Fisher CA	1	5
Hess AJ	1	5
JM&MAG Fishing	1	5
Kleinsmidt AS	1	5
Maree DC	1	5
Maree SJ	1	5
Marshall NM	1	5
Okkers WJ	1	5
Raaff EA	1	5
Sea Plant Products	1	5
Windvogel CEP	1	5
Bailie HG	1	4

2001		
Vessel owner/lessee	Vessels	Fishers
Daniels A	1	4
Erwee O	1	4
Fisher CJ	1	4
Fisher WJ	1	4
Hess JH	1	4
Kennedy CR	1	4
Maree NP	1	4
Motades GS	1	4
Nowers JA	1	4
Le Roux JM	1	3
Dyer Island Visserye	1	2

Data source: FIHB (2002)

APPENDIX A5: West Coast Rock Lobster



Map A5.1: The west coast rock lobster commercial fishery Zones A to D.
Source: Clark, (2002:11)

Table A5.1: Summary of west coast rock lobster fishery between 1993 and 2002 in terms of fleet characteristics, access rights concentration, quota share distribution and the number of quota shares.

		Fishing Season										
		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	
Fleet characteristics	Ave length	13.5	11.9	11.3	10.2	10.68	10.4	10.4	10.1	10.6	10.5	
	Ave age	28	27	26	27	26	26	27	27	29	30	
	Vessels	181	255	217	184	148	182	153	209	176	170	
	Fishers	2083	2565	2135	1873	1318	1606	1481	1966	1761	1693	
	Ave fishers	11.5	10.1	9.8	10.2	8.9	8.8	9.7	9.4	10.0	10.0	
Number of companies		94	155	137	114	103	130	115	143	125	116	
Concentration (vessels)	Top 3	23%	16%	18%	16%	13%	12%	12%	12%	12%	11%	
	Top 5	30%	23%	22%	23%	18%	15%	18%	15%	16%	15%	
	Top 10	38%	29%	31%	34%	28%	23%	26%	27%	27%	29%	
	Top 30	64%	46%	47%	51%	47%	40%	42%	42%	44%	48%	
Concentration (fishers)	Top 3	32%	26%	25%	28%	18%	18%	17%	17%	17%	16%	
	Top 5	40%	34%	33%	36%	26%	25%	24%	23%	23%	23%	
	Top 10	51%	42%	41%	45%	38%	33%	35%	33%	33%	35%	
	Top 30	71%	60%	61%	64%	63%	56%	60%	56%	57%	61%	
Quota share distribution	Total	2200000	2139240	2166960	1993742	1510744	1695000	1916031	1916031	1700000	1588056	1513383
	Average	56410	43658	23554	20344	14667	11453	10825	10825	8458	7940	8007
	Std dev	50499	45422	38765	34398	25175	21214	19704	19704	14777	13839	13429
	Highest	199229	194035	194035	176420	130555	134713	139713	139713	106375	99429	95649
	Lowest	1031	461	215	196	145	320	387	387	943	881	1450
	Diff high to low	198198	193574	193820	176224	130410	134393	139326	139326	105432	98548	94199
Number of quota holders		39	49	92	98	103	148	177	177	201	200	189

Data source: FIHB (1992 to 2002)

Table A5.2a: West coast rock lobster fishery: vessel owner/charterer, number of vessels owned/leased and number of fishers employed (1992 to 1994).

1992			1993			1994		
Owner/charterer	Vessels	Fishers	Owner/charterer	Vessels	Fishers	Owner/charterer	Vessels	Fishers
Lamberts Bay Canning	16	266	Lamberts Bay Canning	17	278	Lamberts Bay Canning	17	278
North Bay Canning	10	222	SA Sea Products	17	211	SA Sea Products	11	139
SA Sea Products	16	175	North Bay Canning	8	179	Paternoster Visserye	12	115
Paternoster Visserye	11	104	Paternoster Visserye	13	127	North Bay Canning	5	114
John Ovenstone	2	64	Walters EFH	4	68	Walters EFH	3	56
Namaqua Canning	2	52	Wiemar A&G	3	55	Wiemar A&G	3	55
Walters EFH	3	48	John Ovenstone	2	44	Van Zyl CJW	4	38
Weimar A	2	48	Van Zyl CJW	4	38	Redelinghuys WP	3	30
Da Mata JJ	3	39	Redelinghuys WP	4	36	Sea Fern Fishing	1	30
Van Zyl CJW	4	38	Bridger & Angelico	3	36	St Helena Bay Fishing Ind	9	27
Bridger & Angelico	3	36	Port Nolloth Fisheries	2	32	Poggenpoel JA	2	26
Port Nolloth Fisheries	2	32	Sea Fern Fishing	1	30	Vaughan A	2	26
St Helena Bay Fishing Ind	9	27	Marine Products	4	28	Namaqua Canning	1	26
Vaughan A	2	26	St Helena Bay Fishing Ind	9	27	Elandsbaai Handelsmpy	6	24
Chapmans Peak Fisheries*	4	24	Vaughan A	2	26	Bridger & Angelico	2	24
Marine Products	3	24	Poggenpoel JA	2	26	Marine Products	3	22
Peninsula Fisheries	1	24	Namaqua Canning	1	26	John Ovenstone	1	22
Plaatjies W	2	21	Belalo	2	24	Peninsula Fisheries	1	22
Elandsbaai Handelsmpy	4	20	Peninsula Fisheries	1	24	Plaatjies W	2	21
Redelinghuys HJ	2	20	Elandsbaai Handelsmpy	5	22	Lusitania Fishing	1	20
Clipper Fishing	1	20	Plaatjies W	2	21	Poseidon Sea Products	1	20
Fernlene	1	20	Da Luz L	1	20	South Sea Fishing (96)	1	20
Poseidon Sea Products	1	20	Fernlene	1	20	Stephan Rock Lobster	3	18
Saldanha Bay Canning	3	18	Lusitania Fishing	1	20	Achmat S	1	18
Achmat S	1	18	Poseidon Sea Products	1	20	Konsortium Kreefbelange	1	18
Mandith Investments	1	17	South Sea Fishing Namibia	1	20	Manuel ME	1	18
Langklip Seeprodukte	3	15	Saldanha Bay Canning	3	18	Mandith Investments	1	17
Morris GD	1	15	Horn J	2	18	Cape Coast (94)	1	16

1992			1993			1994		
Owner/charterer	Vessels	Fishers	Owner/charterer	Vessels	Fishers	Owner/charterer	Vessels	Fishers
Angelico L	1	14	Achmat S	1	18	Luciano Fishing	1	16
Digiorgio GM	1	14	Manuel ME	1	18	Martins E	1	16
Ferreira JN	1	14	Wichmann PA	3	17	Port Nolloth Fisheries	1	16
Russo V	1	14	Mandith Investments	1	17	Fernandes FL	1	15
Sancho SJR	1	14	Luciano Fishing	1	16	Cloete JA	2	14
Abreu Fishing	1	12	Langklip Seeprodukte	3	15	Digiorgio GM	1	14
Andrew RG	1	12	Fernandes FL	1	15	Ferreira JN	1	14
Batsilva	1	12	Morris GD	1	15	Fortune MA & Sons	1	14
Belalo	1	12	Cloete JA	2	14	Sancho SJR	1	14
Da Silva A	1	12	Angelico L	1	14	Langklip Seeprodukte	3	13
De Florenca JJG	1	12	Digiorgio GM	1	14	Elandia Visserye	3	12
De Jesus Fishing	1	12	Ferreira JN	1	14	Laubscher DJ	2	12
De Jesus Telo M*	1	12	Fortune MA & Sons	1	14	Saldanha Bay Canning	2	12
Eleftel Fishing	1	12	Russo V	1	14	Abreu Fishing	1	12
El-Pescador	1	12	Sancho SJR	1	14	Angelico L	1	12
Ferntelo Trading	1	12	Elandia Visserye	3	12	Batsilva	1	12
Ferriera MR	1	12	Laubscher DJ	2	12	Chasday Fishing	1	12
Ferro Fishing	1	12	Abreu Fishing	1	12	Da Mata JJ	1	12
Gomes Fishing	1	12	Andrew RG	1	12	Da Silva A	1	12
Lacot Investments	1	12	Batsilva	1	12	Da Silva J	1	12
Lino JDN	1	12	Chasday Fishing	1	12	Eleftel Fishing	1	12
Lusitania Fishing	1	12	Cyril Burrel Fishing (94)	1	12	Fernfino	1	12
Menezes JE	1	12	Da Mata JJ	1	12	Ferntelo Trading	1	12
Muzzell MT	1	12	Da Silva A	1	12	Ferro Fishing	1	12
New Mexico	1	12	De Florenca JJG	1	12	Gomes Fishing	1	12
Philita	1	12	De Jesus Fishing	1	12	Lacot Investments	1	12
Poggenpoel JA	1	12	Eleftel Fishing	1	12	Lino JDN	1	12
Rebelo Fishing	1	12	Fernfino	1	12	Menezes JE	1	12
Southern Sea Fishing	1	12	Ferntelo Trading	1	12	Mentel Fishing (94)	1	12
Teles AH	1	12	Ferriera MR	1	12	Muzzell MT	1	12

1992			1993			1994		
Owner/charterer	Vessels	Fishers	Owner/charterer	Vessels	Fishers	Owner/charterer	Vessels	Fishers
Vasco da Gama Fishing	1	12	Ferro Fishing	1	12	Nagel NH	1	12
Viera D	1	12	Gomes Fishing	1	12	Rebelo Fishing	1	12
Virissimo AND	1	12	Lacot Investments	1	12	Soares M	1	12
Wasserfall EC	1	12	Lino JDN	1	12	Southern Sea Fishing	1	12
April CJ	1	10	Menezes JE	1	12	St Anne Fishing (95)	1	12
Burger NJ	1	10	Mentel Fishing (94)	1	12	Teles AH	1	12
De Jesus MR	1	10	Muzzell MT	1	12	Vasco da Gama Fishing	1	12
Fernandes JG	1	10	Nagel NH	1	12	Viera D	1	12
Fransman PJ	1	10	New Mexico	1	12	Virissimo AND	1	12
North Blinder	1	10	Philita	1	12	Wasserfall EC	1	12
Telo Bros	1	10	Rebelo Fishing	1	12	Slarmie MH	2	10
Tiger Reef Fishing	1	10	Silva Fishing Ent	1	12	April CJ	1	10
Paul do Mar Fishing	1	9	Soares M	1	12	Burger NJ	1	10
Three Coins	1	9	Southern Sea Fishing	1	12	De Jesus Fishing	1	10
Scholtz AD	1	8	Teles AH	1	12	De Jesus MR	1	10
Canoa Fishing	1	7	Vasco da Gama Fishing	1	12	FDS Fishing	1	10
Coast Trading*	1	7	Viera D	1	12	Fernandes JG	1	10
Stephan Rock Lobster	3	6	Virissimo AND	1	12	Fransman PJ	1	10
Bosveld Fishing	1	6	Wasserfall EC	1	12	Impala Fishing (95)*	1	10
Da Silva D*	1	6	Wichmann TM	1	12	North Blinder	1	10
Da Silva J	1	6	Zeelie C	1	12	Telo Bros	1	10
Fernmon	1	6	Slarmie MH	2	10	Three Coins	1	9
John Quality	1	6	April CJ	1	10	Burger GTJ	2	8
Laubscher DJ	1	6	Burger NJ	1	10	Horn J	1	8
Lino F	1	6	Cottle HD	1	10	Johnson A	1	8
Martins E	1	6	De Jesus MR	1	10	Lennert G	1	8
Redelinghuys AJF	1	6	FDS Fishing	1	10	Thiart FGJ	1	8
Brand WFJR	1	4	Fernandes JG	1	10	Botha WJ	1	7
Burger DJG	1	4	Fransman PJ	1	10	Canoa Fishing	1	7
Burger GTJ	1	4	North Blinder	1	10	Coetzee JJ	1	7

1992			1993			1994		
Owner/charterer	Vessels	Fishers	Owner/charterer	Vessels	Fishers	Owner/charterer	Vessels	Fishers
Elandia Visserye	1	4	Telo Bros	1	10	Helena JB	1	7
Joe Fishing	1	4	Tiger Reef Fishing	1	10	Heuvel M	1	7
Meyer W	1	4	Paul do Mar Fishing	1	9	Angle JJ	1	6
Van der Merwe JE	1	4	Three Coins	1	9	Bodenstein CP	1	6
Adams CR	1	2	Burger GTJ	2	8	David Larenco Fishing (94)	1	6
Clarke M	1	2	Johnson A	1	8	De Sousa Rock Lobster	1	6
			Lennert G	1	8	Fernmon	1	6
			Botha WJ	1	7	Fredericks J	1	6
			Brothers Fishing (94)	1	7	Hestermann BE	1	6
			Canoa Fishing	1	7	John Quality	1	6
			Coetzee JJ	1	7	Lino F	1	6
			Helena JB	1	7	Organ RJ	1	6
			Heuvel M	1	7	Pesce	1	6
			Stephan Rock Lobster	3	6	Redelinghuys AJF	1	6
			Angle JJ	1	6	Sampson FA	1	6
			Bidenstein CP	1	6	Claasen J	1	5
			Bosveld Fishing	1	6	Coetzer DW	1	5
			Cape Coast (94)	1	6	Julies JF	1	5
			Da Silva J	1	6	Koopman J	1	5
			David Larenco Fishing (94)	1	6	Wichmann PA	1	5
			De Sousa Rock Lobster	1	6	Brand WFJR	1	4
			Fernmon	1	6	Burger DJG	1	4
			Fredericks J	1	6	Meyer W	1	4
			Hestermann BE	1	6	Adams JFT	1	3
			John Quality+E34	1	6	Burger PW	1	3
			Lino F, Julies LWJ (98?)	1	6	Cronje FG	1	3
			Martins E	1	6	Jordaan PJ	1	3
			Organ RJ	1	6	Maree NP	1	3
			Pesce	1	6	Slabber CA	1	3
			Prinsloo & Zeeman (94)	1	6	Swartz EG	1	3

1992			1993			1994		
Owner/charterer	Vessels	Fishers	Owner/charterer	Vessels	Fishers	Owner/charterer	Vessels	Fishers
			Redelinghuys AJF	1	6	Swain MJ	1	3
			Sampson FA	1	6	Abelse D	1	2
			Smith EW (94)	1	6	Adams CR	1	2
			Claasen J	1	5	Adams JP	1	2
			Coetzer DW	1	5	Arendse IF	1	2
			Julies JF	1	5	Clarke M	1	2
			Koopman J	1	5	Coraizen DR	1	2
			Brand WFJR	1	4	Joshua NR	1	2
			Burger DJG	1	4	Kotze G	1	2
			Joe Fishing	1	4	Lombard JJ	1	2
			Van der Merwe JE	1	4	Lotz DC	1	2
			Burger PW	1	3	Louw WA	1	2
			Cronje FG	1	3	Prins J	1	2
			Jordaan PJ	1	3	Solomons CJ	1	2
			Luyters MMA	1	3	Van der Merwe JJ	1	2
			Maree NP	1	3	Williams FMM	1	2
			Slabber CA	1	3	Williams J	1	2
			Swain MJ	1	3	Williams JLG	1	2
			Swartz EG	1	3	Swain NL	1	2
			Abelse D	1	2			
			Adams CR	1	2			
			Adams JP	1	2			
			Arendse IF	1	2			
			Clarke M	1	2			
			Coraizen DR	1	2			
			Elandbaai Handelsmpy	1	2			
			Joshua NR	1	2			
			Kotze G	1	2			

Data source: FIHB (1993 to 1995)

Table A5.2b: West coast rock lobster fishery: vessel owner/charterer, number of vessels owned/leased and number of fishers employed (1995 to 1997).

1995			1996			1997		
Owner/Charterer	Vessels	Fishers	Owner/Charterer	Vessels	Fishers	Owner/Charterer	Vessels	Fishers
Lamberts Bay Canning	17	278	Paternoster Visserye	10	98	SA Sea Products	9	133
SA Sea Products	8	127	SA Sea Products	6	85	Lamberts Bay Canning	6	80
North Bay Canning	5	114	North Bay Fishing (97)	3	60	Paternoster Visserye	7	72
Paternoster Visserye	10	98	Namaqua Fishing	2	52	North Bay Canning	3	56
Weimar A&G	3	55	Lamberts Bay Canning	5	49	Namaqua Fishing (97)	2	54
Van Zyl CJW	4	38	Southern Sea Fishing	3	48	Dyer Island Visserye	2	36
Walters EFH	2	36	Redelinghuys WP	3	30	Redelinghuys WP	3	30
John Ovenstone	1	32	Elandsbaai Handelsmpy	6	26	Elandsbaai Handelsmpy	6	26
Redelinghuys WP	3	30	Dodeka Fishing	1	25	Poggenpoel JA	2	26
St Helena Bay Fishing Ind	9	27	Vaughan A	2	25	Dodeka Fishing	1	25
Poggenpoel JA	2	26	Da Mata JJ	2	24	Bridger & Angelico	2	24
Namaqua Canning	1	26	Bridger & Angelico	2	24	Da Mata JJ	2	24
Elandsbaai Handelsmpy	6	24	Plaatjies W	2	21	Weimar A&G	1	24
Bridger & Angelico	2	24	Dyer Island Visserye	1	19	Wichmann TM	3	23
Peninsula Fisheries	1	22	Achmat S	1	18	Poseidon Sea Products	1	20
Plaatjies W	2	21	Konsortium Kreefbelange	1	18	Horn J	2	18
Lusitania Fishing	1	20	Horn J	2	18	Achmat S	1	18
Poseidon Sea Products	1	20	Mandith Investments	1	17	Konsortium Kreefbelange	1	18
Achmat S	1	18	Cyril Burrel Fishing (94)	1	16	Manuel ME	1	18
Konsortium Kreefbelange	1	18	Ferro Fishing	1	16	Mandith Investments	1	17
Manuel ME	1	18	Luciano Fishing	1	16	Elandia Visserye	4	16
Mandith Investments	1	17	Port Nolloth Fisheries	1	16	Johnson A	2	16
Burger NJ	2	16	Elandia Visserye	4	16	Van Dyk C	2	16
Luciano Fishing	1	16	Virissimo AND	1	15	Cyril Burrel Fishing (94)	1	16
Port Nolloth Fisheries	1	16	Digiorgio GM	1	14	Luciano Fishing	1	16
Fernandes FL	1	15	Cloete JA	2	14	Port Nolloth Fisheries	1	16
Stephan Rock Lobster	2	14	Abreu Fishing	1	12	Walters Boot Belange	1	16
Cloete JA	2	14	Angelico L	1	12	Plaatjies W	2	15

1995			1996			1997		
Owner/Charterer	Vessels	Fishers	Owner/Charterer	Vessels	Fishers	Owner/Charterer	Vessels	Fishers
Batsilva	1	14	Batsilva	1	12	Virissimo AND	1	15
Digiorgio GM	1	14	Belalo	1	12	Cloete JA	2	14
Ferreira JN	1	14	Da Silva A	1	12	Digiorgio GM	1	14
Fortune MA & Sons	1	14	Ferntelo Trading	1	12	Fortune MA & Sons	1	14
Sancho SJR	1	14	Gomes Fishing	1	12	Russo V	1	14
Elandia Visserye	3	12	Jessica Fishing (96)	1	12	Sancho SJR	1	14
Saldanha Bay Canning	2	12	Nagel NH	1	12	St Helena Bay Fishing Ind	3	12
Marine Products	2	12	Poggenpoel JA	1	12	Laubscher DJ	2	12
Laubscher DJ	2	12	Rebelo Fishing	1	12	Marine Products	2	12
Abreu Fishing	1	12	Soares M	1	12	September VBG	2	12
Angelico L	1	12	Wasserfall EC	1	12	Abreu Fishing	1	12
Chasday Fishing	1	12	Wichmann TM	1	12	Angelico L	1	12
Da Mata JJ	1	12	Mentel Fishing (94)	1	12	Batsilva	1	12
Da Silva A	1	12	Marine Products	2	12	Belalo	1	12
Da Silva J	1	12	Laubscher DJ	2	12	Da Silva A	1	12
Eleftel Fishing	1	12	April CJ	1	10	Eleftel Fishing	1	12
Fernfino	1	12	Burger NJ	1	10	Ferntelo Trading	1	12
Ferro Fishing	1	12	De Jesus MR	1	10	Gomes Fishing	1	12
Gomes Fishing	1	12	FDS Fishing	1	10	Lino JDN	1	12
Jessica Fishing (96)	1	12	Fernandes JG	1	10	Menezes JE	1	12
Lino JDN	1	12	Fransman PJ	1	10	Mentel Fishing (94)	1	12
Menezes JE	1	12	North Blinder	1	10	Nagel NH	1	12
Mentel Fishing (94)	1	12	Telo Bros	1	10	Rebelo Fishing	1	12
Nagel NH	1	12	Van Zyl CJW	1	10	Southern Sea Fishing	1	12
Rebelo Fishing	1	12	Slarmie MH	2	10	St Anne Fishing (95)	1	12
Soares M	1	12	Three Coins	1	9	Teles AH	1	12
Southern Sea Fishing	1	12	St Helena Bay Fishing Ind	3	9	Wasserfall EC	1	12
St Anne Fishing (95)	1	12	John Ovenstone	1	8	Slarmie MH	2	11
Teles AH	1	12	John Quality,	1	8	Vaughan A	1	11
Vaughan A	1	12	Johnson A	1	8	April CJ	1	10

1995			1996			1997		
Owner/Charterer	Vessels	Fishers	Owner/Charterer	Vessels	Fishers	Owner/Charterer	Vessels	Fishers
Viera D	1	12	Lennert G	1	8	Burger NJ	1	10
Virissimo AND	1	12	Burger GTJ	2	8	FDS Fishing	1	10
Wasserfall EC	1	12	Canoa Fishing	1	7	Fernandes JG	1	10
Slarmie MH	2	10	Coetzee JJ	1	7	Fransman PJ	1	10
April CJ	1	10	Angle JJ	1	6	Impala Fishing (95)*	1	10
De Jesus Fishing	1	10	David Larenco Fishing (94)	1	6	Lino F	1	10
De Jesus MR	1	10	De Sousa Rock Lobster	1	6	North Blinder	1	10
Fernandes JG	1	10	Hestermann BE	1	6	Soares M	1	10
Fransman PJ	1	10	Impala Fishing (97)	1	6	South Sea Fishing (96)	1	10
Impala Fishing (95)*	1	10	Organ RJ	1	6	Telo Bros	1	10
North Blinder	1	10	Redelinghuys AJF	1	6	West Point Fishing	1	10
Telo Bros	1	10	Sampson FA	1	6	Three Coins	1	9
Three Coins	1	9	September VBG	1	6	Burger GTJ	2	8
Burger GTJ	2	8	Van der Merwe AJ	1	6	De Jesus MR	1	8
Horn J	1	8	Van Dyk C	1	6	Fernfino	1	8
Johnson A	1	8	Wichman CR	1	6	John Ovenstone	1	8
Lennert G	1	8	Claasen J	1	5	John Quality	1	8
Canoa Fishing	1	7	Fortune MA & Sons	1	5	Lennert G	1	8
Coetzee JJ	1	7	Julies JF	1	5	Canoa Fishing	1	7
Helena JB	1	7	Koopman J	1	5	Coetzee JJ	1	7
Angle JJ	1	6	Brand WFJR	1	4	Young VM	2	6
Bodenstein CP	1	6	Burger DJG	1	4	Albertyn L	1	6
David Larenco Fishing (94)	1	6	Jordaan JJ	1	4	Angle JJ	1	6
De Sousa Rock Lobster	1	6	Meyer W	1	4	David Larenco Fishing (94)	1	6
Fredericks J	1	6	Penguin Visserye	1	4	De Sousa Rock Lobster	1	6
Hestermann BE	1	6	Solomons CJ	1	4	Hestermann BE	1	6
John Quality	1	6	Theart AJ	1	4	Redelinghuys AJF	1	6
Organ RJ	1	6	Burger PW	1	3	Sampson FA	1	6
Redelinghuys AJF	1	6	Cronje FG	1	3	Wichman CR	1	6
Sampson FA	1	6	Jordaan PJ	1	3	Cronje FG	2	5

1995			1996			1997		
Owner/Charterer	Vessels	Fishers	Owner/Charterer	Vessels	Fishers	Owner/Charterer	Vessels	Fishers
Claasen J	1	5	Slabber CA	1	3	Grundlingh CJJ	1	5
Julies JF	1	5	Swain MJ	1	3	Viking Inshore	1	5
Koopman J	1	5	Swartz EG	1	3	Brand WFJR	1	4
Brand WFJR	1	4	Abelse D	1	2	Burger DJG	1	4
Burger DJG	1	4	Adams CR	1	2	Clarke M	1	4
Meyer W	1	4	Adams JP	1	2	Daniels A	1	4
Adams JFT	1	3	Arendse IF	1	2	Delcarme AS	1	4
Burger PW	1	3	Coraizen DR	1	2	Jordaan JJ	1	4
Cronje FG	1	3	Joshua NR	1	2	King C	1	4
Jordaan PJ	1	3	Kotze G	1	2	Lourens PG	1	4
Maree NP	1	3	Lombard JJ	1	2	Meyer W	1	4
Slabber CA	1	3	Lotz DC	1	2	Penguin Visserye	1	4
Swain MJ	1	3	Louw WA	1	2	Solomons CJ	1	4
Swartz EG	1	3	Sekoor D	1	2	Theart AJ	1	4
Abelse D	1	2	Williams FMM	1	2	Van Antwerpen CJ	1	4
Adams CR	1	2				Wessels MJL	1	4
Arendse IF	1	2				Burger PW	1	3
Coraizen DR	1	2				Daniels J	1	3
Kotze G	1	2				Fredericks J	1	3
Lombard JJ	1	2				Heugh BW	1	3
Lotz DC	1	2				Julies JF	1	3
Louw WA	1	2				Raynard MA	1	3
Payne DW (96)	1	2				Roux DC	1	3
Prins J	1	2				Slabber CA	1	3
Williams FMM	1	2				Swain MJ	1	3
Williams J	1	2				Swartz EG	1	3
						Abelse D	1	2
						Adams CR	1	2
						Arendse IF	1	2
						Booysen JH	1	2

1995			1996			1997		
Owner/Charterer	Vessels	Fishers	Owner/Charterer	Vessels	Fishers	Owner/Charterer	Vessels	Fishers
						Coraizen DR	1	2
						Daniels LH	1	2
						Joshua NR	1	2
						Kotze G	1	2
						Lotz DC	1	2
						Louw WA	1	2
						Sekoor D	1	2
						Stoffberg JHE	1	2
						Van der Merwe AJ	1	2
						Williams CP	1	2
						Williams FMM	1	2
						Williams J	1	2

Data source: FIHB (1996 to 1998)

Table A5.2c: West coast rock lobster fishery: vessel owner/charterer, number of vessels owned/leased and number of fishers employed (1998 to 2000).

1998			1999			2000		
Owner/Charterer	Vessels	Fishers	Owner/Charterer	Vessels	Fishers	Owner/Charterer	Vessels	Fishers
SA Sea Products	6	107	Lamberts Bay Canning	11	150	Lamberts Bay Canning	11	153
Lamberts Bay Canning	6	83	SA Sea Products	8	114	SA Sea Products	6	90
Paternoster Visserye	6	63	Paternoster Visserye	6	63	North Bay Fishing (97)	4	62
North Bay Canning	4	62	North Bay Canning	4	62	Namaqua Fishing (98)	2	54
Elandsbaai Handelsmpy	6	46	Namaqua Fishing (97)	2	54	Elandsbaai Handelsmpy	5	44
Elandia Visserye	4	44	Elandsbaai Handelsmpy	6	46	Paternoster Visserye	4	44
Da Mata JJ	2	32	Elandia Visserye	4	44	Elandia Visserye	4	44
Redelinghuys WP	3	30	Young VM	7	38	Young VM	5	32
St Helena Bay Fishing Ind	2	30	SA Comm Fishermens Corp	6	38	Da Mata JJ	2	32

1998			1999			2000		
Owner/Charterer	Vessels	Fishers	Owner/Charterer	Vessels	Fishers	Owner/Charterer	Vessels	Fishers
Namaqua Fishing (98)	1	28	Dyer Island Visserye	2	37	SA Comm Fishermens Corp (2000)	5	30
Dewmist Invest	1	25	Walters EFH	2	36	St Helena Bay Fishing Ind	2	30
Dodeka Fishing	1	25	St Helena Bay Fishing Ind	4	34	Redelinghuys WP	3	26
Weimar A&G	1	24	Da Mata JJ	2	32	Dewmist Invest	1	25
Burger GTJ	2	22	Redelinghuys HJ	3	30	Dodeka Fishing	1	25
Plaatjies W	2	21	Poggenpoel JA	2	26	Weimar A&G	1	24
Goldfish Fishing Trust (99)	1	20	Dewmist Invest	1	25	Premier Fishing	3	23
Luciano Fishing	1	20	Dodeka Fishing	1	25	Burger GTJ	2	22
Horn J	2	18	Weimar A&G	1	24	Mullin R (99)	2	22
Johnson Fisheries (99)	2	18	Burger GTJ	2	22	Plaatjies W	2	21
Sancho SJR	1	18	Mullin (2000)	2	22	Luciano Fishing	1	20
Mandith Investments	1	17	Plaatjies W	2	21	Unfondini Fishing	1	20
Ferro Fishing	1	16	Luciano Fishing	1	20	Johnson Fisheries (99)	2	18
Port Nolloth Fisheries	1	16	Unfondini Fishing	1	20	Horn J	2	18
Walters Boot Belange (96)	1	16	Goldfish Fishing Trust (99)	1	20	Achmat S	1	18
Lino JDN	1	15	Johnson Fisheries (99)	2	18	Helena JB	1	18
Virissimo AND	1	15	Achmat S	1	18	MFV Santa Isabel Vessel Co (2001)	1	18
Angelico L	1	14	Konsortium Kreefbelange	1	18	Sancho SJR	1	18
Batsilva	1	14	Lambertsbaai Kreefprodukte	1	18	Lambertsbaai Kreefprodukte	1	18
Menezes JE	1	14	Manuel ME	1	18	Dyer Island Visserye	1	17
Mullin R (99)	1	14	Ferro Fishing	1	16	Walters Boot Belange (96)	1	16
Belalo	1	12	Sibanya Fishing	1	16	Ferro Fishing	1	16
Da Silva A	1	12	Cloete JA	2	15	Sibanya Fishing	1	16
Digiorgio GM	1	12	Southern Sea Fishing	2	15	Lino JDN	1	15
Eleftel Fishing	1	12	Lino JDN	1	15	Sancho SR (99?)	1	15
Gomes Fishing	1	12	Virissimo AND	1	15	Virissimo AND	1	15
Laubscher DJ	2	12	Angelico L	1	14	Angelico L	1	14
Marine Products	2	12	Batsilva	1	14	Cyril Burrel Fishing (94)	1	14
Mentel Fishing (94)	1	12	Cyril Burrel Fishing (94)	1	14	Menezes JE	1	14
Nagel NH	1	12	Fortune MA & Sons	1	14	Batsilva	1	14

1998			1999			2000		
Owner/Charterer	Vessels	Fishers	Owner/Charterer	Vessels	Fishers	Owner/Charterer	Vessels	Fishers
Rebelo Fishing	1	12	Menezes JE	1	14	Geelbek Visserye (2000)	2	12
Slarmie MH	2	12	Geelbek Visserye (2000)	2	12	Laubscher DJ	2	12
Soares M	1	12	Laubscher DJ	2	12	Wichmann PA	2	12
St Anne Fishing (95)	1	12	September VBG	2	12	Belalo	1	12
Teles AH	1	12	Wichmann PA	2	12	Teles AH	1	12
Wasserfall EC	1	12	Belalo	1	12	Wasserfall EC	1	12
Wichmann PA	2	12	Bridger & Angelico	1	12	Digiorgio GM	1	12
Vaughan A	1	11	Da Silva A	1	12	Gomes Fishing	1	12
April CJ	1	10	De Florenca JJG	1	12	Eleftel Fishing	1	12
Brand WFJR	1	10	Digiorgio GM	1	12	Rebelo Fishing	1	12
Burger NJ	1	10	Eleftel Fishing	1	12	Soares M (2001)	1	12
FDS Fishing	1	10	Gomes Fishing	1	12	St Anne Fishing (95)	1	12
Fernandes JG	1	10	Mentel Fishing (94)	1	12	Continental Fishing (2001)	1	12
Fransman PJ	1	10	Nagel NH	1	12	Wichmann TM	1	12
Impala Fishing (95)*	1	10	Rebelo Fishing	1	12	Da Silva A	1	12
North Blinder	1	10	St Anne Fishing (95)	1	12	Nagel NH	1	12
Penguin Visserye	1	10	Teles AH	1	12	Mentel Fishing (94)	1	12
Redelinghuys AJF	1	10	Wasserfall EC	1	12	Vaughan A	1	11
South Sea Fishing (96)	1	10	Wichmann TM	1	12	Fransman PJ	1	10
Telo Bros	1	10	Vaughan A	1	11	Dromedaris Visserye	1	10
Three Coins	1	10	Albertyn L	2	10	Telo Bros	1	10
Fernfino	1	8	Brand WFJR	1	10	April CJ	1	10
Ferntelo Trading	1	8	Burger NJ	1	10	Redelinghuys AJF	1	10
John Quality	1	8	FDS Fishing	1	10	Three Coins	1	10
Poseidon Sea Products	1	8	Fernandes JG	1	10	MFV Welgemoed Vessel Co	1	10
Sampson FA	1	8	Fransman PJ	1	10	MFV Deus de Ajude Ves Co	1	10
Van der Merwe AJ	1	8	Horn J	1	10	King Solomon Foods	1	10
Angle JJ	1	7	Impala Fishing (95)*	1	10	Wiemar A&G	1	10
Canoa Fishing	1	7	Malgas Visserye	1	10	Impala Fishing (95)*	1	10
Cloete JA	1	7	North Blinder	1	10	Pike Rock Lobster Corp+Z4	1	10

1998			1999			2000		
Owner/Charterer	Vessels	Fishers	Owner/Charterer	Vessels	Fishers	Owner/Charterer	Vessels	Fishers
Coetzee JJ	1	7	Penguin Visserye	1	10	Penguin Visserye	1	10
Southern Sea Fishing	1	7	Redelinghuys AJF	1	10	MFV Statendam Vessel Co (2001)	1	10
Abreu Fishing	1	6	South Sea Fishing (96)	1	10	North Blinder	1	10
Bridger & Angelico	1	6	Telo Bros	1	10	Burger NJ	1	10
David Larenco Fishing (94)	1	6	Van Zyl CJW	1	10	Malgas Visserye	1	10
De Sousa Rock Lobster	1	6	Viking Inshore	1	10	Sampson FA	1	8
Hestermann BE	1	6	King Solomon Foods (2000)	1	10	Alfred GJ (2001)	1	8
Julies LWJ (98?)	1	6	Fernfino	1	8	Van der Merwe AJ	1	8
Raynard MA	1	6	Ferntelo Trading	1	8	Ferntelo Trading	1	8
Roux DC	1	6	Horn J	1	8	MFV Jenny Ann Ves Co (2001)	1	8
September VBG	1	6	John Ovenstone	1	8	Nascimento SF	1	8
Slabber CA	1	6	John Quality+W4	1	8	Canoa Fishing	1	7
Swartz EG	1	6	Lennert G	1	8	Angle JJ	1	7
Van Dyk C	1	6	Nascimento SF	1	8	Cloete JA	1	7
Adams CR	1	5	Sampson FA	1	8	De Sousa Rock Lobster	1	6
Grundlingh CJJ	1	5	Van der Merwe AJ	1	8	David Larenco Fishing (94)	1	6
Julies JF	1	5	Angle JJ	1	7	Abreu Fishing	1	6
Booysen JH	1	4	Canoa Fishing	1	7	Slabber CA	1	6
Burger DJG	1	4	Coetzee JJ	1	7	September VBG	1	6
Clarke M	1	4	Cronje FG	2	6	Hestermann BE	1	6
Cronje FG	1	4	Abreu Fishing	1	6	Marine Products/Foodcorp	1	6
Daniels A	1	4	David Larenco Fishing (94)	1	6	Raynard MA	1	6
Delcarme AS	1	4	De Sousa Rock Lobster	1	6	Roux DC	1	6
King C	1	4	Hestermann BE	1	6	Swartz EG	1	6
Lourens PG	1	4	Lino F, Julies LWJ (98?)	1	6	Van Dyk C	1	6
Maree NP	1	4	Marine Products/Foodcorp	1	6	Adams CR	1	5
Meyer W	1	4	Organ RJ	1	6	Engelbrecht JG (2001)	1	5
Theart AJ	1	4	Raynard MA	1	6	Van Antwerpen CJ	1	5
Van Antwerpen CJ	1	4	Roux DC	1	6	Grundlingh CJJ	1	5
Wessels MJL	1	4	Slabber CA	1	6	Delcarme AS	1	4

1998			1999			2000		
Owner/Charterer	Vessels	Fishers	Owner/Charterer	Vessels	Fishers	Owner/Charterer	Vessels	Fishers
Coraizen DR	1	3	Soares M	1	6	Maree NP	1	4
Daniels J	1	3	Swartz EG	1	6	Burger DJG	1	4
Fredericks J	1	3	Van Dyk C	1	6	King C	1	4
Heugh BW	1	3	Wichman CR	1	6	Meyer W	1	4
Kotze G	1	3	Adams CR	1	5	Booysen JH	1	4
Sekoor D	1	3	Claasen J	1	5	Cronje FG	1	4
Swain MJ	1	3	Grundlingh CJJ	1	5	Wessels MJL	1	4
Abelse D	1	2	Julies JF	1	5	Lourens PG	1	4
Arendse IF	1	2	Van Antwerpen CJ	1	5	Daniels A	1	4
Daniels LH	1	2	Booysen JH	1	4	Theart AJ	1	4
Joshua NR	1	2	Burger DJG	1	4	Kennedy CR	1	4
Lotz DC	1	2	Daniels A	1	4	Daniels J	1	3
Stoffberg JHE	1	2	Delcarme AS	1	4	Fredericks J	1	3
Williams CP	1	2	Jordaan JJ	1	4	Kotze G	1	3
Williams FMM	1	2	Kennedy CR	1	4	Stoffberg JHE	1	3
Williams J	1	2	King C	1	4	Sekoor D	1	3
			Lourens PG	1	4	Coraizen DR	1	3
			Maree NP	1	4	Heugh BW	1	3
			Meyer W	1	4	Swain MJ	1	3
			Solomons CJ	1	4	Daniels LH	1	2
			Theart AJ	1	4	Williams CP	1	2
			Wessels MJL	1	4	Abelse D	1	2
			Adams JFT	1	3	Williams FMM	1	2
			Burger PW	1	3	Lotz DC	1	2
			Coraizen DR	1	3	Arendse IF	1	2
			Daniels J	1	3	Day AJ	1	2
			Fredericks J	1	3			
			Heugh BW	1	3			
			Jordaan PJ	1	3			
			Sekoor D	1	3			

1998			1999			2000		
Owner/Charterer	Vessels	Fishers	Owner/Charterer	Vessels	Fishers	Owner/Charterer	Vessels	Fishers
			Stoffberg JHE	1	3			
			Swain MJ	1	3			
			Abelse D	1	2			
			Adams JP	1	2			
			Arendse IF	1	2			
			Daniels LH	1	2			
			Joshua NR	1	2			
			Lombard JJ	1	2			
			Lotz DC	1	2			
			Louw WA	1	2			
			Payne DW (96)	1	2			
			Williams CP	1	2			
			Williams FMM	1	2			
			Williams J	1	2			

Data source: FIHB (1999 to 2001)

Table A5.2d: West coast rock lobster fishery: vessel owner/charterer, number of vessels owned/leased and number of fishers employed (2001).

2001		
	Vessels	Fishers
Lamberts Bay Fishing	8	121
SA Sea Products	6	90
North Bay Fishing (97)	4	62
Paternoster Visserye	5	58
Namaqua Fishing (98)	2	54
SA Comm Fishermens Corp	7	48
Elandsbaai Handelsmpy	5	44

2001		
	Vessels	Fishers
Elandia Visserye	4	44
Young VM	7	41
Sancho SJR	2	33
Da Mata JJ	2	32
St Helena Bay Fishing Ind	2	30
Belalo	2	27
Dewmist Invest	1	25
Dodeka Fishing	1	25
Weimar A&G	1	24
Premier Fishing	3	23
Burger GTJ	2	22
Mullin R (99)	2	22
Plaatjies W	2	21
Redelinghuys WP	2	20
Goldfish Fishing Trust (99)	1	20
Luciano Fishing	1	20
Horn J	2	18
Johnson Fisheries (99)	2	18
Achmat S	1	18
Lambertsbaai Kreefprodukte	1	18
MFV Santa Isabel Vessel Co (2001)	1	18
Dyer Island Visserye	1	17
Ferro Fishing	1	16
Walters Boot Bel (2000)	1	16
Lino JDN	1	15
Virissimo AND	1	15
Angelico L	1	14
Menezes JE	1	14
Geelbek Visserye (2000)	2	12
Laubscher DJ	2	12

2001		
	Vessels	Fishers
Wichmann PA	2	12
Continental Fishing (2001)	1	12
Da Silva A	1	12
Das Neves JT	1	12
Digiorgio GM	1	12
Gomes Fishing	1	12
Mentel Fishing (94)	1	12
Nagel NH	1	12
Rebelo Fishing	1	12
St Anne Fishing (95)	1	12
Teles AH	1	12
Ukloba Fishing (2002)	1	12
Wasserfall EC	1	12
Vaughan A	1	11
April CJ	1	10
Blue Horizon Fishing (2002)	1	10
Brand WFJR	1	10
CSM Fisning (2002)	1	10
Fransman PJ	1	10
Impala Fishing (95)*	1	10
MFV Deus de Ajude Ves Co (2001)	1	10
MFV Statendam Vessel Co (2001)	1	10
MFV Welgemoed Vessel Co (2001)	1	10
Noordbaai Vissers (2002)	1	10
North Blinder	1	10
Penguin Visserye	1	10
Redlinghuys (2002)	1	10
Redelinghuys AJF	1	10
Telo Bros	1	10
Three Coins	1	10

2001		
	Vessels	Fishers
Alfred GJ (2001)	1	8
MFV Atlantic Ocean Vessel Co (2002)	1	8
MFV Jenny Ann Ves Co (2001)	1	8
Nascimento SF	1	8
Sampson FA	1	8
Van der Merwe AJ	1	8
Angle JJ	1	7
Canoa Fishing	1	7
Cloete JA	1	7
David Larenco Fishing (94)	1	6
De Sousa Rock Lobster	1	6
Julies LWJ (2002)	1	6
Hestermann BE	1	6
Marine Products/Foodcorp	1	6
Raynard MA	1	6
Roux DC	1	6
September VBG	1	6
Slabber CA	1	6
Swartz EG	1	6
Tiger Reef Fishing (2002)	1	6
Van Dyk C	1	6
Adams CR	1	5
Engelbrecht JG (2001)	1	5
Grundlingh CJJ	1	5
Van Antwerpen CJ	1	5
Booysen JH	1	4
Burger DJG	1	4
Cronje FG	1	4
Daniels A	1	4
Delcarme AS	1	4

2001		
	Vessels	Fishers
Kennedy CR	1	4
King C	1	4
Lourens PG	1	4
Maree NP	1	4
Meyer W	1	4
Wessels MJL	1	4
Coraizen DR	1	3
Daniels J	1	3
Fredericks J	1	3
Heugh BW	1	3
Kotze G	1	3
Sekoor D	1	3
Stoffberg JHE	1	3
Swain MJ	1	3
Arendse IF	1	2
Daniels LH	1	2
Lotz DC	1	2
Williams CP	1	2
Williams FMM	1	2

Data source: FIHB (2002)

APPENDIX A6: Pelagic

Table A6.1: Structure of the anchovy and pilchard purse seine fleet (1993 to 2001).

		Fishing season									
		1992	1993	1994	1995	1996	1997	1998	1999	2001	2001
>12 to 14 (small)	Avg length					13		13			
	Ave age					42		13			
	Avg GRT					10		19			
	Ave Kwt					86		146			
	Vessels					1		1			
	Fishers					14		15			
	Ave fishers					14		15			
>14 to 18 (medium)	Avg length								15		15
	Ave age								21		23
	Avg GRT								36		36
	Ave Kwt								175		175
	Vessels								1		1
	Fishers								12		16
	Ave fishers								12		16
>18 to 20 (medium)	Avg length	20	20	20	20	19	19	19	19	19	19
	Ave age	25	24	20	23	17	36	36	20	21	26
	Avg GRT	73	79	88	77	66	54	54	64	64	70
	Ave Kwt	251	263	299	277	218	169	169	230	230	235
	Vessels	6	5	3	3	3	1	1	3	3	2
	Fishers	62	53	28	30	44	10	10	30	30	20
	Ave fishers	10	11	9	10	15	10	10	10	10	10
>20 to 25 (medium)	Avg length	22	22	22	22	22	22	22	22	22	22
	Ave age	18	19	20	21	21	21	20	22	22	-27
	Avg GRT	96	97	98	99	101	100	103	101	100	102
	Ave Kwt	335	329	334	338	348	350	358	352	352	349
	Vessels	54	58	55	56	48	38	22	39	32	27
	Fishers	499	539	510	520	449	357	212	376	313	266
	Ave fishers	9	9	9	9	9	9	10	10	10	10
>25 to 30 (medium)	Avg length	26	26	26	26	26	27		27	27	27
	Ave age	17	18	14	20	20	22		23	22	23
	Avg GRT	143	143	157	157	143	161		158	140	140
	Ave Kwt	436	436	456	456	424	436		449	440	440
	Vessels	7	7	8	8	7	7		8	6	6
	Fishers	66	66	75	73	65	64		76	58	58
	Ave fishers	9	9	9	9	9	9		10	10	10
>30 to 35 (medium)	Avg length	34	32	33	34	33	33	33	34	33	34
	Ave age	13	14	15	18	17	17	19	20	19	22
	Avg GRT	289	271	282	289	282	279	349	279	279	279
	Ave Kwt	783	702	755	783	755	720	875	720	720	720
	Vessels	3	4	3	4	3	4	3	5	4	5
	Fishers	40	43	34	50	34	46	34	59	45	57
	Ave fishers	13	11	11	13	11	12	11	12	11	11
>35 to 40 (large)	Avg length					36	36		36	37	37
	Ave age					18	19		23	15	16
	Avg GRT					344	344		334	391	391
	Ave Kwt					873	873		911	639	890
	Vessels					4	4		6	4	4
	Fishers					55	55		81	58	58
	Ave fishers					14	14		14	15	15

		Fishing season									
		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
>12 to 14	Avg length	12	13	13	13	13	12	13	13	11	11
	Avg age	14	16	19	20	25	20	15	23	6	7
	Avg GRT	21	17	20	20	15	16	22	16	18	18
	Ave Kwt	92	89	116	110	105	99	137	102		
	Vessels	5	7	5	5	3	5	2	4	1	1
	Fishers	60	92	72	72	46	62	22	48	14	14
	Avg fishers	12	13	14	14	15	12	11	12	14	14
>14 to 18	Avg length	16	15	15	15	15	16	16	16	16	16
	Avg age	23	17	23	23	25	15	17	21	22	28
	Avg GRT	35	30	34	31	32	26	33	28	28	28
	Ave Kwt	142	146	132	134	136	154	166	150	152	127
	Vessels	7	8	9	9	9	6	5	7	7	5
	Fishers	109	145	153	171	147	130	106	139	139	99
	Avg fishers	16	18	17	19	16	22	21	20	20	20
>18 to 20	Avg length	19	19	19	19	19	18		19	19	19
	Avg age	18	15	15	12	11	9		10	11	13
	Avg GRT	48	69	71	71	70	63		79	79	72
	Ave Kwt	192	217	236	239	230	215		242	242	237
	Vessels	2	10	9	5	6	3		4	3	4
	Fishers	40	193	172	88	112	63		79	60	81
	Avg fishers	20	19	19	18	19	21		20	20	20
>20 to 25	Avg length	21	23	22	22	23	22	22	22	22	22
	Avg age	15	21	25	21	21	20	20	21	23	24
	Avg GRT	87	93	91	95	93	93	96	107	102	104
	Ave Kwt	307	299	286	297	267	289	310	345	332	326
	Vessels	3	8	11	10	9	20	14	22	21	17
	Fishers	34	98	136	142	123	229	191	248	259	221
	Avg fishers	11	12	12	14	14	11	14	11	12	13
>25 to 30	Avg length		28	28	28	26	27	29	27	28	28
	Avg age		32	31	32	29	24	35	25	27	28
	Avg GRT		114	114	114	100	169	202	143	168	168
	Ave Kwt		293	293	293	252	469	447	451	511	511
	Vessels		3	3	3	1	4	1	4	5	5
	Fishers		39	39	39	9	45	20	49	61	61
	Avg fishers		13	13	13	9	11	20	12	12	12
>30 to 35	Avg length		36	36	34	33	34	33	33	34	34
	Avg age		23	24	19	18	19	19	20	21	22
	Avg GRT		332	332	287	272	282	349	282	317	330
	Ave Kwt		793	793	815	790	755	875	755	798	823
	Vessels		2	2	3	2	4	3	3	4	4
	Fishers		38	38	38	22	46	34	36	47	47
	Avg fishers		19	19	13	11	12	11	12	12	12
>35 to 40	Avg length						36		36		
	Avg age						22		26		
	Avg GRT						364		364		
	Ave Kwt						900		900		
	Vessels						2		3		
	Fishers						28		44		
	Avg fishers						14		15		

Data Source: FIHB (1992 to 2002)

Table A6.2: Asset size distribution for anchovy and pilchard quota shares (1989 to 2001).

		1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	2000	2001
			Quota Board					Interim Quota Board				MLRA	
Average	a. Anchovy	26163	11538	11535	24857	23867	17201	12282	4047		2279	2512	7784
	b. Pilchard	2063	4375	2154	1929	1660	1650	2773	2951	2176	1382	1454	2101
	b/a*	0.08	0.38	0.19	0.08	0.07	0.10	0.23	0.73		0.61	0.58	0.27
Median	a. Anchovy	24560	10307	11312	24562	24729	16500	11442	3738		1077	1252	3879
	b. Pilchard	1265	3494	1760	1569	1251	1199	1692	1813	516	500	548	792
	b/a	0.05	0.34	0.16	0.06	0.05	0.07	0.15	0.49		0.46	0.44	0.20
Highest	a. Anchovy	46570	19396	20053	45866	43839	31785	28258	8862		10423	10993	28977
	b. Pilchard	6000	10872	6000	6000	6000	6700	15253	16288	17461	17431	16205	23070
	b/a	0.13	0.56	0.30	0.13	0.14	0.21	0.54	1.84		1.67	1.47	0.80
Lowest	a. Anchovy	14201	4021	5713	2450	2520	1820	1470	490		320	570	1763
	b. Pilchard	716	1977	846	750	665	638	423	453	415	483	448	647
	b/a	0.05	0.49	0.15	0.31	0.26	0.35	0.29	0.92		1.51	0.79	0.37
Diff highest and lowest	a. Anchovy	32369	15375	14340	43416	41319	29965	26788	8372		10103	10423	27214
	b. Pilchard	5284	8895	5154	5250	5335	6062	14830	15835	17046	16948	15757	22423
	b/a	0.16	0.58	0.36	0.12	0.13	0.20	0.55	1.89		1.68	1.51	0.82
Quota holders	a. Anchovy	12	13	13	14	15	15	17	17		43	48	48
	b. Pilchard	8	8	13	14	14	14	23	23	36	69	76	76
	b/a	0.67	0.62	1.00	1.00	0.93	0.93	1.35	1.35		1.60	1.58	1.58

* b/a: ratio of anchovy assert size to the pilchard asset size
Data source: FIHB (1989 to 2002)

Table A6.3: Asset size distribution for pilchard bait quota shares (1993 to 2001).

	1993	1994	1995	1996	1997	1998	2000	2001
Average	130	134	230	243	278	278	358	503
Median	80	81	147	157	188	188	324	467
Highest	858	858	1195	1280	1280	1280	1186	1713
Lowest	5	5	7	7	7	7	6	10
Diff high & low	853	853	1188	1273	1273	1273	1180	1703
Quota holders	28	32	33	33	33	33	32	32

Data source: FIHB (1989 to 2002)

Edible Anchovy

Below are the characteristics of the edible anchovy quota shares

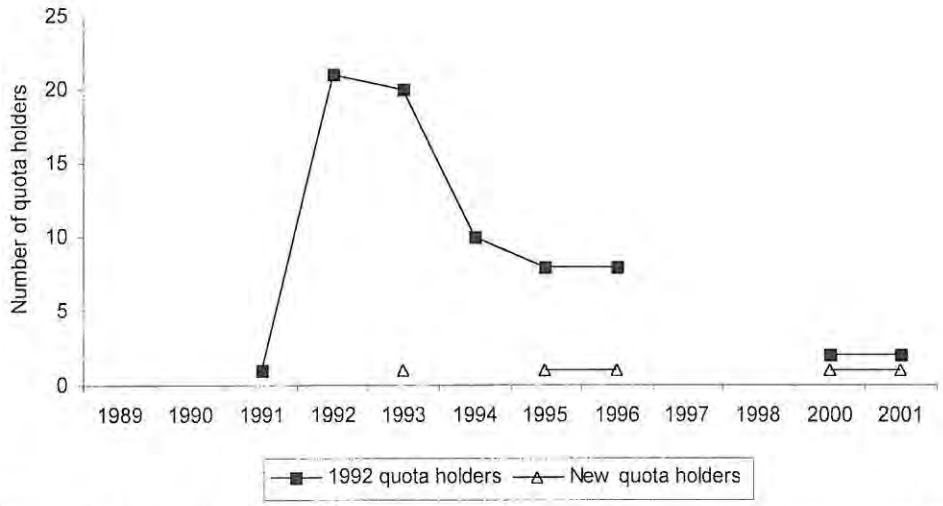


Figure A6.1: Distribution of edible anchovy quota shares between 1992 quota holders and new quota holders (1989 to 2001).

Data Source: FIHB (1989 to 2002)

Table A6.4: The distribution, entry and exit of edible anchovy quota shares (1990 to 2001).

	Fishing Season											
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
	Quota Board					Interim Quota Board				MLRA		
Quota holders		1	21	21	10	9	9				3	3
1992 quota holders Successful		1	21	20	10	8	8				2	2
Entry (new entrants)												
successful											1	1
unsuccessful				1		1						
Exit												
New entrants					-1			-1				
1992 quota holders				-1	-11	-2	-1	-8				

Data Source: FIHB (1990 to 2002).

Table A6.5: Percentage of TAC held by successful edible anchovy companies (1991 to 2001).

	1991	1992	1993	1994	1995	1996	1997	1998	2000	2001
	Quota Board				Interim Quota Board				MLRA	
Successful 1992 quota holders (% of TAC)										
Elandia Visserye		10%	10%	10%	17%	17%			33%	33%
Donaggi U		5%	5%	5%	8%	8%			17%	17%
New quota holder (% of TAC)										
Trade Props									50%	50%
Other (% of TAC)										
		85%	85%	85%	75%	75%			0%	0%

Data Source: FIHB (1991 to 2002)

Table A6.6: Summary of the anchovy & pilchard fishery between 1993 and 2001.

		Fishing Season									
		1992	1993	1994	1995	1996	1997	1998	1999	2001	2001
Fleet characteristics	Avg length	23	23	23	23	24	24	23	25	25	25
	Ave age	18	19	19	21	20	21	20	22	21	23
	Avg GRT	107	110	112	115	126	139	125	143	141	149
	Ave Kwt	357	355	365	374	397	424	382	439	409	441
	Vessels	70	74	69	71	66	54	27	62	49	45
	Fishers	667	701	647	673	661	532	271	634	504	475
	Ave fishers	10	9	9	9	10	10	10	10	10	11
Companies		27	29	27	27	29	21	13	26	23	26
Concentration (vessels)	Top 3	31%	31%	32%	31%	30%	33%	56%	37%	43%	29%
	Top 5	49%	49%	48%	51%	47%	50%	70%	50%	59%	47%
	Top 10	73%	73%	74%	75%	71%	80%	89%	73%	73%	64%
Concentration (Gross Registered Tonnage)	Top 3	30%	36%	33%	36%	40%	40%	67%	41%	46%	38%
	Top 5	54%	53%	52%	56%	56%	55%	78%	55%	64%	53%
	Top 10	78%	79%	79%	81%	77%	84%	88%	79%	83%	73%
Average	Anchovy	24857	23867	17201	12282	4047	2176	2279		2512	7784
	Pilchard	1929	1660	1650	2773	2951		1382		1454	2101
Median	Anchovy	24562	24729	16500	11442	3738	516	1077		1252	3879
	Pilchard	1569	1251	1199	1692	1813		500		548	792
Highest	Anchovy	45866	43839	31785	28258	8862	17461	10423		10993	28977
	Pilchard	6000	6000	6700	15253	16288		17431		16205	23070
Lowest	Anchovy	2450	2520	1820	1470	490	415	320		570	1763
	Pilchard	750	665	638	423	453		483		448	647
Diff highest and lowest	Anchovy	43416	41319	29965	26788	8372	17046	10103		10423	27214
	Pilchard	5250	5335	6062	14830	15835		16948		15757	22423
Quota holders	Anchovy	14	15	15	17	17	36	43		48	48
	Pilchard	14	14	14	23	23		69		76	76
	Total	28	29	29	40	40	36	112		124	124

Data Source: FIHB (1992 to 2002)

Table A6.7: Summary of the bait fishery between 1993 and 2001.

		Fishing Season									
		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Fleet characteristics	Avg length	16	19	20	20	19	22	22	22	22	23
	Avg age	18	19	22	21	21	19	20	21	22	23
	Avg GRT	43	74	78	82	75	109	112	116	115	121
	Ave Kwt	167	232	244	269	239	330	341	357	363	371
	Vessels	17	38	39	35	30	44	25	47	41	36
	Fishers	243	605	610	550	459	603	373	643	580	523
	Avg fishers	14	16	16	16	15	14	15	14	14	15
Companies		16	37	37	33	28	35	20	33	26	28
Concentration (Vessels)	Top 3	24%	11%	13%	14%	13%	23%	32%	28%	38%	28%
	Top 5	35%	16%	18%	20%	20%	27%	40%	38%	45%	36%
	Top 10	65%	29%	31%	34%	37%	43%	60%	51%	60%	50%
Concentration (GRT)	Top 3	23%	17%	19%	40%	36%	41%	58%	47%	53%	46%
	Top 5	33%	19%	22%	49%	46%	52%	68%	62%	67%	57%
	Top 10	60%	38%	41%	66%	66%	70%	85%	75%	81%	75%
Quota shares characteristics	Average		130	134	230	243	278	278		358	503
	Median		79.6	80.9	147	157	188	188		324	467
	Highest		858	858	1195	1280	1280	1280		1186	1713
	Lowest		5	5	7	7	7	7		6	10
	Diff high & low		853	853	1188	1273	1273	1273		1180	1703
	Quota holders		28	32	33	33	33	33		32	32

Data Source: FIHB (1992 to 2002)

Table A6.8: Ownership (lessees) of vessels with anchovy & pilchard access rights by company name.

	1992			1993			1994			1995			1996			1997			1998			1999			2000			2001		
	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L
St Helena Bay Fishing Ind	6	889	60	7	1160	70	7	1171	70	8	1267	77	7	1459	71	7	1392	70	7	1462	72	6	1303	64	1	99	10	4	1133	45
Lamberts Bay Canning	7	650	70	9	859	89	8	776	79	7	684	69	5	517	49	5	517	49	5	517	50	11	1225	110	12	1306	121	4	424	40
Marine Products	7	901	66	7	895	66	5	715	48	7	895	66	6	796	57	4	616	39				4	616	40	4	616	39	4	616	39
Suid Oranje Visserye	6	856	61	6	712	54	6	712	54	7	1014	70	7	1200	77	6	1101	68				6	1091	69				1	99	10
SA Sea Products	8	716	70	7	648	63	7	648	63	7	752	66	6	652	57	4	481	38				1	93	10	1	93	10	4	468	41
West Point Fishing	3	349	30	4	633	39	4	633	39	4	633	39	3	384	30	4	633	39	1	138	10	3	509	29	1	138	10	1	138	10
Saldanha Bay Canning	5	588	45	4	475	36	4	475	36	3	366	27	3	396	28	1	161	10	1	103	10	2	305	20	1	140	10	1	140	10
Eigelaar AFJ & Seuns	3	297	27	4	403	36	4	403	36	4	403	36	4	403	36	4	403	36	3	278	28	4	403	37	3	278	28	3	278	28
Oranjerivier Visserye	3	295	28	3	295	27	3	295	28	3	295	27	3	295	27	5	483	45				4	603	38	4	603	38	2	408	20
Southern Sea Fishing	3	292	28	3	292	28	3	292	28	3	292	28	3	292	30	3	367	29	2	193	19	3	367	29	4	943	42			
Trawlvis	1	175	9	1	175	9	1	175	9	1	175	9	1	175	9				1	175	10									
Paternoster Visserye	2	165	18	2	165	18	2	165	18	2	165	18	1	89	9				2	189	18	2	189	18	1	100	9	1	100	9
Jocob Rose Beleggings							1	113	9				1	113	9							1	113	9						
Columbine Canning	1	100	9	1	100	9	1	100	9	1	100	9																		
Riaan E Fishing				1	99	12	1	99	10	1	99	10	1	99	10															
Riviergans Visserye							1	99	9	1	99	10	1	99	10	1	99	10				1	99	10	1	99	10	1	99	10
Wildegans Fisheries							1	99	10	1	99	10	1	99	10	1	99	10				1	99	10						
Fourie CH/&Eksteen Pelagies	1	92	8	1	92	8	1	92	10	1	92	10	1	92	10	1	92	10	1	92	10	1	92	10	1	92	10	1	92	10
Groenewald HD	1	90	9	1	90	9	1	90	9	1	90	9																		
Sandy Point Canning	2	209	18	1	89	9	1	89	9																					
Pyper PJ	1	87	9	1	87	9	1	87	9	1	87	9	1	87	9	1	87	9	1	87	10	1	87	10	1	87	10	1	87	10
Germishuys JP	1	81	10	1	81	10	1	81	10	1	81	10	1	81	10	1	81	10				1	81	10	1	81	10			
Thiart JGN	1	81	9	1	81	9	1	81	9	1	81	9	1	81	9															
Weskus Vissers Ko Op	1	77	8	1	77	9	1	77	9	1	77	9	1	77	9															
Groenewald JH/				1	71	9	1	71	9	1	71	9	1	71	9	1	71	9				1	71	9	1	71	9			
Sound Props	1	65	11	1	65	9	1	65	9	1	65	9																		
Swart WJ	1	54	9	1	54	9	1	54	9	1	54	9	1	54	9															
Wessels HDC	1	99	9	1	99	9																								
Wessels JE	1	99	12	1	99	12																								

	1992			1993			1994			1995			1996			1997			1998			1999			2000			2001		
	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L
Hout Bay Fishing	1	79	15	1	79	15																								
Sneeugans Visserye	1	54	9	1	54	10				1	54	10	1	54	10	1	54	10	1	54	10	1	54	10	1	54	10	1	54	10
Moolman & Lourens				1	88	9																								
Chapmans Peak Fisheries	1	43	10																											
Premier Fishing													1	304	11	1	304	11				2	583	22	5	950	52	5	950	52
Altantic Trawling																									1	525	24	1	525	24
Ntabeni Fishing																									1	273	11	1	273	11
Trade Props 153																												1	145	10
BJ Engelbricht Visserye																									1	147	10	1	147	10
The Fish Exchange																									1	89	9	1	89	9
Ukloba Fishing cc																												1	93	10
AC Maclachlan																												1	89	10
Noordbaaai Vissers																												1	81	10
Kalahari Fishing																1	81	9	1	81	9	1	81	12	1	81	12	1	81	12
Walters Boot Belange										1	75	9										1	36	12				1	36	16
Arno Louis																												1	71	9
Bergans Visserye													1	90	9	1	90	9				1	90	9						
Bressler JS																			1	19	15									
Griffiths HCL													1	58	24															
Lusitania Fishing																						1	52	10						
Poggenpoel JA													1	10	14															
Oosterlig Visserye													1	158	9															
Towerkop Fishing																1	273	12				1	273	12						
Trachurus Trawling																						1	331	15						
Troika Trading 18																									1	52	10			

V: Vessels, GRT: Gross Registered Tonnage, L: Fishers
Data Source: FIHB (1992 to 2002)

Table A6.9: Ownership (lessees) of vessels with bait access rights by company name.

	1992			1993			1994			1995			1996			1997			1998			1999			2000			2001		
	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L
Marcon Fish/Foodcor	1	81	9	1	100	9	1	100	9	1	100	9	1	100	9	4	616	39				4	616	40	4	616	39	4	616	39
St Helena Bay Fishing Ind				1	81	9	2	170	18	3	641	31	2	545	22	5	1078	45	5	1217	54	4	1061	46	3	978	36	3	1028	36
SA Sea Products							1	86	10	1	86	10	1	86	10							1	93	10				3	369	31
Lamberts Bay Canning				1	102	10	1	102	10	1	102	10	1	102	10	2	207	20	2	207	20	7	817	71	9	990	91	2	207	20
Achmat S	1	16	18	1	16	18	1	16	18	1	16	18	1	16	18	1	16	18				1	16	18	1	16	18	1	16	18
Tredoux SPJ & AB	1	36	9	1	36	9	1	36	9	1	36	9	1	36	9				1	36	9	1	36	9	1	36	9	1	36	9
Weimar A&G	1	30	24	1	30	24	1	30	24	1	30	24	1	30	24	1	30	24	1	30	24	1	30	24	1	30	24	1	30	24
Griffiths HCL				1	58	24	1	58	24	1	58	24	1	58	24	1	58	24				1	58	24	1	58	24	1	58	25
South West Trawlers				1	202	18	1	202	18	1	202	18				1	202	18	1	202	20	1	202	20	1	202	20	1	202	20
Trautman Fishing Ent				1	92	20	1	92	20													1	92	26	1	92	26	1	92	26
Walters EFH	2	76	36	2	392	46	2	76	36	1	36	16	2	76	36															
Suid Oranje Visserye				1	302	16	2	401	25	1	302	16				1	302	16				2	666	32						
De Jesus MR	1	25	10	1	25	10	1	25	10	1	25	10																		
Lusitania Fishing	1	52	20	1	52	20	1	52	20	1	52	20	1	52	20	1	52	20												
Paternoster Visserye	1	22	12	1	22	12	1	27	9	1	27	9	1	27	9															
Poseidon Sea Products	1	27	20	1	27	20	1	27	20	1	27	20	1	27	20	1	27	20	1	27	8	1	27	8						
Wildegans Fisheries	1	45	20				1	77	9							1	99	10				1	99	10						
De Sousa F				1	43	10	1	43	20																					
DMA Fishing Ent							1	27	16	1	27	16	1	66	24															
Fernandes JG				1	20	12	1	20	15	1	20	15	1	20	15															
Gansbaai Fishing							1	20	12	1	20	12	1	20	12															
Hout Bay Fishing				1	79	15	1	79	15	1	79	15	1	79	15															
John Ovenstone							1	51	22	1	51	32	1	113	9															
Kingma K				1	92	26	1	92	26							1	30	25	1	33	25	1	31	25	1	31	25			
Kunene Investment							1	86	20	1	86	20	1	86	20				1	86	30									
Manuel De Olim Fish				1	57	18	1	57	18																					

	1992			1993			1994			1995			1996			1997			1998			1999			2000			2001		
	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L
Mostert J & AV Grasveld				1	40	12	1	40	12	1	40	12																		
Northcoast Seafood				1	118	15	1	118	15																					
Oosterlig Visserye							1	158	9	1	158	9	1	158	9															
Penglides P				1	78	19	1	78	19	1	78	19	1	78	19	1	78	19				1	78	19						
Pimenta EM				1	77	16	1	77	16	1	99	20	1	99	20															
Poggenpoel JA				1	10	14	1	10	14	1	10	14	1	10	14	1	10	14				1	10	14						
SA Tuna Exporters				1	93	18	1	91	18	1	103	18																		
Steyl PB				1	30	20	1	50	20	1	31	20	1	32	20															
Transat				1	362	22	1	362	22																					
Williams HS							1	9	12	1	9	12	1	9	12							1	9	12						
Weskus Vissers Ko Op							1	77	9																					
AC Maclachlan																												1	89	10
Blue Water Fishing																1	86	18							1	86	30	1	86	30
Dewmist Invest													1	93	25	1	93	25	1	96	25	1	100	25	1	99	25	1	98	25
Dyer Island Visserye																1	20	12	1	20	8	1	107	8	1	20	8	1	20	8
Edwards Fishing																			1	181	12	1	181	12	2	448	24	1	181	12
Eagle Fishing																												1	267	12
Eyethu Fishing																1	158	9				1	158	9	1	158	9	1	158	9
Fourie CH&Eksteen Pelagies																						1	92	10				1	92	10
G&K Fisheries																1	18	14	1	18	14				1	18	14	1	18	14
Groenewald JH													1	71	9	1	71	9							1	71	9	1	71	9
Jurassic Fishing Ent										1	31	28				1	30	28	1	33	28	1	30	28	1	31	28	1	30	28
MFV Arizon 2																												1	52	20
Noordbaaai Vissers																												1	81	10
Premier Fishing Co																									1	93	10	1	93	10
Risar Fishing																1	30	20	1	33	20	1	30	20	1	30	20	1	30	20
Riviergans Visserye																1	99	10	1	99	10	1	99	10	1	99	10	1	99	10
Trade Props 153																												1	145	10
Visko Sea Products																1	105	22	1	105	28	1	105	28	1	105	28	1	105	28
Oranjerivier Visserye				1	95	9				1	95	9	1	95	9	2	195	18				2	195	18	2	195	18			

	1992			1993			1994			1995			1996			1997			1998			1999			2000			2001		
	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L	V	GRT	L
Arniston Fishing																1	20	15				1	20	15	1	20	15			
Fourie CH																1	92	10	1	92	10				1	92	10			
Germishuys JP																1	81	10				1	81	10	1	81	10			
Bergans Visserye																1	90	9				1	90	9						
Kingma G																						1	18	14						
Southern Sea Fishing													1	51	16	1	93	10	1	93	9	1	93	9						
Summers RD																1	93	10	1	96	10	1	107	10						
Masakhane Fishing																1	99	9	1	99	9									
Williams A	1	9	12	1	9	12										1	9	12												
Columbine Canning																1	282	12												
West Point Fishing																1	249	9												
Bridgitte Trust										1	92	26																		
Jocob Rose Beleggings										1	113	9																		
Awie Botes Visserye				1	30	26																								
Ella S Fishing				1	67	21																								
Fish DM				1	9	12																								
I&J				1	69	20																								
Marais I				1	17	12																								
RautenbachSP				1	20	12																								
Suid Oranje Visserye				1	158	9																								
Chapmans Peak Fisheries	1	48	6																											
De Olim J Fishing	1	100	16																											
Eigelaar AFJ & Seuns	1	80	9																											
Hugo SS	1		6																											
Manos B	1	38	16																											

V: Vessels, GRT: Gross Registered Tonnage, L: Fishers
Data Source: FIHB (1992 to 2002)

APPENDIX A7: Inshore Trawl

Table A7.1: Access right licences of the inshore trawl fleet (1992 to 2001).

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Tr	11%	12%	5%	6%	23%	16%		21%	18%	16%
Tr,Hl	11%		11%	42%	39%	39%	50%	41%	45%	41%
Tr,Hl,Tu	58%	63%	58%	27%	23%	32%	42%	29%	30%	31%
	80%	**76%**	**74%**	**76%**	**84%**	**87%**	**92%**	**91%**	**94%**	**88%**
Tr,Hl+other	20%	24%	21%	21%	16%	10%	4%	3%	3%	3%
Tr,Ll+other			5%	3%		3%	4%	6%	3%	9%

Data source: FIHB (1992 to 2002)
Access rights and licences Tr: inshore trawl, Hl: hand-line (not hake), Tu: Tuna, Ll: hake long-line.

Table A7.2: Structure of the inshore trawl fleet (1992 to 2001).

		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
>5 to 8 (micro)	Avg length	7									
	Avg age	7									
	Avg GRT										
	Ave Kwt	134									
	Vessels	1									
	Fishers	10									
	Avg fishers	10									
>8 to 12 (small)	Avg length	12		12	12					9	
	Avg age	11		13	14					7	
	Avg GRT	23		23	23						
	Ave Kwt	93		138	138					115	
	Vessels	1		1	1					1	
	Fishers	12		12	12					10	
	Avg fishers	12		12	12					10	
>12 to 14 (small)	Avg length	13	12	13	13	13	13	14	13	13	13
	Avg age	4	9	4	5	1	2	4	4	9	10
	Avg GRT	23	23	23	23	24	24	24	24	24	24
	Ave Kwt	93	116	118	118	150	150	152	150	150	152
	Vessels	1	2	2	2	5	5	4	5	6	5
	Fishers	12	24	24	24	42	43	38	46	52	46
	Avg fishers	12	12	12	12	8	9	10	9	9	9
>14 to 18 (medium)	Avg length	16	16	16	15	16	16	16	16	16	16
	Avg age	17	15	23	21	10	11	16	13	11	12
	Avg GRT	35	36	35	36	42	42	40	43	52	52
	Ave Kwt	247	264	238	257	283	283	332	283	287	287
	Vessels	5	4	4	3	3	3	2	4	5	5
	Fishers	75	63	58	38	37	37	26	42	54	54
	Avg fishers	15	16	15	13	12	12	13	11	11	11
>18 to 20 (medium)	Avg length	19	19	19	19	20	20	20	20	20	20
	Avg age	19	22	19	16	21	22	23	24	11	29
	Avg GRT	68	64	64	71	71	71	71	71	77	70
	Ave Kwt	297	276	312	340	327	327	327	327	385	259
	Vessels	4	5	4	3	2	2	2	2	1	2
	Fishers	36	54	34	28	20	20	20	20	12	29
	Avg fishers	9	11	9	9	10	10	10	10	12	15

		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
>20 to 25 (medium)	Avg length	22	22	22	22	22	22	22	22	22	22
	Avg age	24	26	27	25	26	25	29	27	29	30
	Avg GRT	76	75	75	81	81	79	81	78	74	73
	Ave Kwt	293	284	285	306	312	329	308	317	312	312
	Vessels	**29**	**26**	**23**	**23**	**17**	**15**	**14**	**15**	**13**	**13**
	Fishers	322	289	261	257	168	162	148	156	136	132
	Avg fishers	11	11	11	11	10	11	11	10	10	10
>25 to 30 (medium)	Avg length	28	28	28	28	29	28.8	28	29	29	29
	Avg age	24	27	28	26	29	0.0	29	29	30	31
	Avg GRT	152	139	139	142	139	152	142	159	159	159
	Ave Kwt	602	496	496	520	496	602	520	653	653	653
	Vessels	4	3	3	3	4	5	3	4	4	4
	Fishers	40	36	36	44	56	68	44	56	56	56
	Avg fishers	10	12	12	15	14	13.6	15	14	14	14
>30 to 35 (medium)	Avg length								35		
	Avg age										
	Avg GRT								581		
	Ave Kwt										
	Vessels								1		
	Fishers								24		
	Avg fishers								24		
>35 to 40 (large)	Avg length		36							35	
	Avg age		11								
	Avg GRT		361							581	
	Ave Kwt		736								
	Vessels		1							1	
	Fishers		20							24	
	Avg fishers		20							24	
>40 to 50 (large)	Avg length										
	Avg age										
	Avg GRT										
	Ave Kwt										
	Vessels										
	Fishers										
	Avg fishers										
>50 to 60 (large)	Avg length										
	Avg age										
	Avg GRT										
	Ave Kwt										
	Vessels										
	Fishers										
	Avg fishers										
<60 to 70 (large)	Avg length	67							72	72	72
	Avg age	31									
	Avg GRT	1441							1745	1745	1745
	Ave Kwt	2375									
	Vessels	1							1	1	1
	Fishers	50							61	61	61
	Avg fishers	50							61	61	61

Data source: FIHB (1992 to 2002)

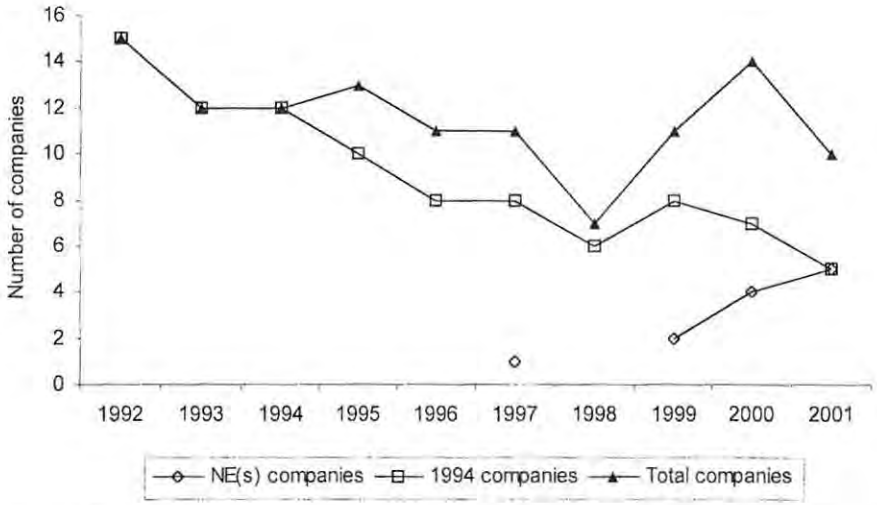


Figure A7.1: Inshore trawl access right holding companies (1992 to 2001).
Data source: FIHB (1992 to 2002)

Table A7.3: Asset sizes for inshore trawl (sole) quota shares (1989 to 2002).

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Total	868	834	843	872	872	843	872	872	872	872	872	872	872	785
Average	62	70	84	79	79	84	79	79	79	79	79	67	67	65
Std Dev	58	85	104	100	100	104	100	100	100	100	100	91	91	81
Highest	221	313	327	327	327	327	327	327	327	327	327	314	314	274
Lowest	5	4	5	5	5	5	5	5	5	5	5	5	5	11
Diff High to low	217	308	322	322	322	322	322	322	322	322	322	309	309	263
Quota holders	14	12	10	11	11	10	11	11	11	11	11	13	13	12

Data source: FIHB (1992 to 2002)

Table A7.4: Asset sizes for inshore trawl (hake) quota shares (1990 to 2002).

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Total	9623	9744	9834	9834	9744	9834	9834	9894	9412	9412	9500	10165	9665
Average	802	974.4	894	894	974.4	894	894	899	856	855.6	730.8	781.9	805.4
Std Dev	1212	1338	1297	1297	1338	1297	1297	1283	1217	1217	1092	1169	1048
Highest	4089	4179	4179	4179	4179	4179	4179	4156	3937	3937	3780	4045	3570
Lowest	88	95.1	89.9	89.9	95.1	90	90	89.5	85.9	85.9	85.86	92	122
Diff High to low	4001	4084	4089	4089	4084	4089	4089	4066	3851	3851	3694	3953	3448
Quota holders	12	10	11	11	10	11	11	11	11	11	13	13	12

Data source: FIHB (1992 to 2002)

Table A7.5: Summary of the anchovy & pilchard fishery between 1993 and 2001.

		Fishing Season										
		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Fleet characteristics	Average length	22	21	21	21	21	21	21	23	22	22	
	Average age	22	23	24	22	20	20	23	22	21	24	
	Average GRT	107	80	70	74	72	75	71	147	151	135	
	Average Kwt	349	299	287	301	301	331	303	321	311	319	
	Vessels	46	41	37	35	31	30	25	32	32	30	
	Fishers	557	486	425	403	323	330	276	405	405	378	
	Average fishers	12	12	11	12	10	11	11	13	13	13	
Companies		15	12	12	13	11	11	7	11	14	10	
Concentration (fishers)	Top 3	49%	58%	59%	55%	58%	55%	69%	52%	52%	60%	
	Top 5	64%	71%	75%	72%	80%	76%	89%	76%	68%	81%	
	Top 10	87%	97%	96%	93%	98%	97%	100%	98%	90%	100%	
Concentration (vessels)	Top 3	48%	63%	62%	57%	61%	60%	72%	47%	47%	53%	
	Top 5	67%	78%	78%	74%	81%	80%	92%	78%	69%	80%	
	Top 10	89%	95%	95%	91%	97%	97%	100%	97%	88%	100%	
Quota share characteristics (hake)	Total	9834	9834	9744	9834	9834	9894	9412	9412	9500	10165	9665
	Average	894	894	974	894	894	899	856	856	731	782	805
	Std dev	1297	1297	1338	1297	1297	1283	1217	1217	1092	1169	1048
	Highest	4179	4179	4179	4179	4179	4156	3937	3937	3780	4045	3570
	Lowest	90	90	95	90	90	90	86	86	86	92	122
	Diff high to low	4089	4089	4084	4089	4089	4066	3851	3851	3694	3953	3448
Quota share characteristics (sole)	Total	872	872	843	872	872	872	872	872	872	872	785
	Average	79	79	84	79	79	79	79	79	67	67	65
	Std dev	100	100	104	100	100	100	100	100	91	91	81
	Highest	327	327	327	327	327	327	327	327	314	314	274
	Lowest	5	5	5	5	5	5	5	5	5	5	11
	Diff high to low	322	322	322	322	322	322	322	322	309	309	263
Quota Holders		11	11	10	11	11	11	11	11	13	13	12

Data source: FIHB (1992 to 2002)

Table A7.6: Ownership (lessees) of vessels with inshore hake and sole trawl access rights by company name.

	1992		1993		1994		1995		1996		1997		1998		1999		2000		2001	
	V	L	V	L	V	L	V	L	V	L	V	L	V	L	V	L	V	L		
I&J	14	166	15	186	11	130	9	101	7	79	7	79	8	90	8	90	8	90	8	90
Mariette Fishing	7	58	7	66	7	64	7	64	7	58	6	51	6	56	6	56	1	12		
Cronje P	4	44	4	44	5	56	4	44	4	44	4	44	3	30	4	42	3	30	3	30
Viking Inshore	6	46	4	31	4	43	4	56	5	51	5	51	4	44	6	60	6	60	7	77
Chettys Fisheries	2	27	2	27	2	27	2	27	2	27	2	27	2	26	2	26	2	26	2	26
South Seas Trawling	3	34	2	20	2	20	2	20	1	12	1	12			1	12				
Port Nolloth White Fish Group	1	12			1	20														
Van Niekerk Fisheries	1	25	2	45	1	20	1	20												
Southern Sea Fishing			1	18	1	16	1	16												
Oosthuizen BD	1	14			1	14	1	14	1	14	1	14	1	12	1	12	1	12	1	12
SeaVuna Fishing Co																	4	36	5	50
Blue Horizon Fishing																			1	10
Eyethu Fishing											1	12			1	12	1	12	1	12
MFV Lorelei Vessel Co																	1	12	1	10
Overberg Trading															1	61	1	61	1	61
Cosmoport							1	10	1	10	1	10			1	10				
Mostert B & Seuns Visserye							1	10												
St Francis Sea Prods							1	12												
Computyre									1	8										
Speath AG									1	8										
Sagittarius Fishing											1	18	1	18						
King Solomon Foods																	1	10		
Striker Fishing Ent																	1	10		
Theart DJ																	1	10		
G&T Fishing	2	42																		
Oosterlig Visserye	1	11	1	14					1	12	1	12								
Paternoster Visserye	1	9	1	9	1	9	1	9												
Atlantic Fishing Ent	1	50																		
Viljoen WL	1	10																		

	1992		1993		1994		1995		1996		1997		1998		1999		2000		2001
	V	L	V	L	V	L	V	L	V	L	V	L	V	L	V	L	V	L	
John Ovenstone	1	9																	
Sea Harvest			1	20											1	24	1	24	
Crous JI			1	6	1	6													

V: Vessels, L: Fishers

Data Source: FIHB (1992 to 2002)

APPENDIX A8: Hake Long-Line Fishery

Table A8.1: Structure of the hake long-line fleet (1999 to 2001).

		1999	2000	2001
>14 to 18 (medium)	Avg length	17	17	
	Avg age	42	43	
	Vessels	1	1	
	Fishers	14	14	
	Avg fishers	14	14	
>18 to 20 (medium)	Avg length	19	19	19
	Avg age	37	38	43
	Vessels	1	1	2
	Fishers	12	12	29
	Avg fishers	12	12	15
>20 to 25 (medium)	Avg length	22	22	22
	Avg age	33	34	36
	Vessels	4	6	2
	Fishers	76	130	45
	Avg fishers	19	22	23
>25 to 30 (medium)	Avg length	27	28	28
	Avg age	27	28	29
	Vessels	1	2	2
	Fishers	21	49	49
	Avg fishers	21	25	25
>30 to 35 (medium)	Avg length	30	32	32
	Avg age	37	33	34
	Vessels	1	2	2
	Fishers	25	43	43
	Avg fishers	25	22	22
>70 (large)	Avg length		11	111
	Avg age		25	26
	Vessels		1	1
	Fishers		85	85
	Avg fishers		85	85

Data source: FIHB (1999 to 2002)

Table A8.2: Hake long-line quota holders.

	Fishing Season		
	2000	2001	2002
The Tuna Hake Fishing Corp	800	867.2	800
SA Commercial Fishermen Corp	300	325.2	300
Noordkaap Visserman Ond.	150	162.6	150
Alicente Fishing	100	108.4	100
Bluefin Fishing Ent	100	108.4	100
Cape Fish Processors	100	108.4	100
Deus Teajus Fishing	100	108.4	100
Diablo Trade 113	100	108.4	100
Ezintlanzini Fishing	100	108.4	100
Ezolwandle Fishing	100	108.4	100
Full Deck Inv	100	108.4	100
Gerombe Fishing	100	108.4	100

	Fishing Season		
	2000	2001	2002
Hentio 1173	100	108.4	100
Humansdrop Comm Factory Workers	100	108.4	100
Impala Fishing	100	108.4	100
Intlanzi Fishing	100	108.4	100
Khulani Fishing	100	108.4	100
Knysna Fishing	100	108.4	100
Kwik Freeze Fisheries	100	108.4	100
Laingville Fisheries	100	108.4	100
LM Fisheries	100	108.4	100
Masikhule Fishing	100	108.4	100
Mossel Bay Indigenous Fishermen	100	108.4	100
Ocean View & Masiphumelele Fishing	100	108.4	100
Pakamani Fishing	100	108.4	100
Pellsrus Historical Fishing Corp	100	108.4	100
Reiger Visserye	100	108.4	100
Rietvlei Fishing	100	108.4	100
Risar Fishing	100	108.4	100
Sibanye Fishing	100	108.4	100
Sizabantu Fishing Corp	100	108.4	100
The Cape Peninsula Line Fishermen	100	108.4	100
Trade Off 65	100	108.4	100
Ukloba Fishing	100	108.4	100
Umfondini Fishing	100	108.4	100
Victor George Newman	100	108.4	100
Young VM Visserye	100	108.4	100
Hacky Fishing			100
Longline Fishing			100
I Fortune & Crew			100
Abanyu Fishing			65
Active twenty			65
African Star Fishing			65
Alice Community Fishing			65
Amaqobela			65
Bafiaansberg			65
Balobi Processors			65
Bayview Fishing			65
Bizafrika 131			65
Bluefin Holdings			65
Combined Fishing Ent			65
Corlink Twenty			65
Cyril Burrel Fishing			65
D Christy & Sons			65
D&M Fisheries			65
DMA Fishing Ent			65
Dyer Island Visserye			65
Eyabantu Fisheries			65
Eyethu Fisheries			65
Ezabantu Fishing			65
Faulkner Fishing Ent			65
Ferro Fishing			65
Gamka Fishing			65
Gibbiseps Visserye			65

	Fishing Season		
	2000	2001	2002
Glomorone			65
Govest Eight			65
Heatwave Fishing			65
Henbase 2361			65
Heniq 2349			65
Imbumba Fishing			65
Injectrade 1100			65
Inter Fish			65
J&J Visserye			65
JPF Fishing			65
Joenardo			65
Kalahari Fishing			65
Laaggety Visserye			65
Maintenance Fishing			65
Mail Bongwe Fisheries			65
Masakhane Dev Trust			65
Masifunde Fishing			65
Mast Fishing			65
Mazidlekhaya Fishing			65
Monodon Fishing Ent			65
Mtolo Victor			65
Nati Si Nako Fishing			65
NPS agencies			65
Open Circle Projects 1			65
Petersens Fishing Ent			65
Premier Fishing			65
Quantus Fishing			65
Railoun Mierwoon			65
Rainbow Nation Fishing			65
RD Summers Fishing			65
Robberg Fast Foods			65
Royal Algoa Fishing Co			65
SA Sea Products			65
Safrika Fishing			65
Sceptre Fishing			65
Sisonke Fishing			65
Siyakha Fishing			65
Solomons Fishing			65
Southern Point Oceanic Fresh Prod			65
Starmark			65
The Fishing Trust			65
Titancor Eleven			65
Trawl Investments			65
Valortrade 1143			65
Vasco Da Gama Fishing			65
Veasatey Trading 249			65
Viking Fishing Co			65
Westford Fishing			65
Yellow Star Trading 1154			65
Your Trade 19			65
Zimele Fishing			65
Fortune and Crew	100	108.4	

	Fishing Season		
	2000	2001	2002
Ionia Fishing Ent	100	108.4	
Ocean Ukhozi Fisheries	100	108.4	
Soundprops 1167 Inv	100	108.4	
Taridor Five	100	108.4	
Xtraprops 147	100	108.4	

Data source: FIHB (2000 to 2002)

APPENDIX A9: Deep Sea Hake Trawl

Table A9.1: The characteristics of the deepsea hake trawl fishing fleet.

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Length	52	53	53	53	50	51	55	50	49	48
Average age	19	20	20	21	20	21	22	23	24	25
Average GRT	701	763	762	801	759	789	878	750	715	724
Average Kwt	1239	1322	1294	1323	1278	1314	1405	1316	1288	1310
Vessels	45	56	52	49	65	57	39	58	62	60
Fishers	1615	2070	1941	1897	2347	2147	1610	2092	2176	2085

Data source: FIHB (1992 to 2002)

Table A9.2: The structure of the deepsea hake trawl fleet.

		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
>25 to 30	Length		29			29	29	28	29	27	27
	Average age		20			25	27	25	29	30	31
	Average GRT		193			158	140	193	140	144	144
	Average Kwt		920			706	599	597	599	556	556
	Vessels		**1**			**3**	**2**	**1**	**2**	**3**	**3**
	Fishers		12			53	41	25	41	51	61
	Average fishers		12			18	21	25	21	17	20
>30 to 35	Length				30	33	33	33	33	33	33
	Average age				25	10	11	12	11	12	13
	Average GRT				140	400	400	400	497	497	497
	Average Kwt				760	700	700	700	1928	1928	1928
	Vessels				**2**	**1**	**1**	**1**	**1**	**1**	**1**
	Fishers				28	25	25	25	30	30	30
	Average fishers				14	25	25	25	30	30	30
>35 to 40 (large)	Length	37	38	38	38	37	37	35	37	37	37
	Average age	9	16	18	12	13	14	13	18	19	20
	Average GRT	470	395	411	438	449	431	563	410	418	418
	Average Kwt	923	907	876	967	992	1020	1104	976	978	978
	Vessels	**3**	**5**	**6**	**4**	**13**	**10**	**2**	**10**	**11**	**11**
	Fishers	68	123	137	126	332	225	48	218	246	246
	Average fishers	23	25	23	32	26	23	24	22	22	22
>40 to 50 (large)	Length	45	44	44	44	45	44	44	44	44	44
	Average age	17	19	21	22	22	23	23	24	25	27
	Average GRT	546	519	521	556	557	547	557	560	551	545
	Average Kwt	1105	1085	1080	1099	1111	1115	1130	1150	1157	1169
	Vessels	**23**	**25**	**25**	**23**	**25**	**22**	**15**	**26**	**27**	**25**
	Fishers	642	649	651	625	669	613	381	712	735	648
	Average fishers	28	26	26	27	27	28	25	27	27	26
>50 to 60 (large)	Length	57	58	55	56	56	55	55	56	55	56
	Average age	30	25	23	20	18	14	17	11	17	18
	Average GRT	695	912	848	837	1054	1136	1067	1357	1069	1211
	Average Kwt	1258	1370	1391	1368	1551	1608	1594	1744	1550	1702
	Vessels	**4**	**4**	**3**	**4**	**5**	**4**	**3**	**3**	**5**	**6**
	Fishers	125	137	97	147	203	178	136	150	225	281
	Average fishers	31	34	32	37	41	45	45	50	45	47

		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
>60 to 70 (large)	Length	62	63	63	61	62	62	61	62	62	62
	Average age	21	22	23	25	24	25	27	27	28	29
	Average GRT	887	916	905	808	879	879	806	879	879	879
	Average Kwt	1502	1603	1555	1457	1480	1480	1430	1480	1480	1480
	Vessels	**13**	**15**	**13**	**8**	**10**	**10**	**10**	**10**	**10**	**10**
	Fishers	660	773	684	408	511	511	495	511	511	511
	Average fishers	51	52	53	51	51	51	50	51	51	51
>70 (large)	Length	78	81	86	81	81	81	80	81	82	82
	Average age	20	16	15	19	20	21	21	27	27	26
	Average GRT	1642	1704	1968	1827	1827	1827	1845	1860	1962	2058
	Average Kwt	1645	1992	2125	2130	2130	2130	2177	2254	2345	2503
	Vessels	**2**	**6**	**5**	**8**	**8**	**8**	**7**	**6**	**5**	**4**
	Fishers	120	376	372	563	554	554	500	430	378	308
	Average fishers	60	63	74	70	69	69	71	72	76	77

Data source: FIHB (1992 to 2002)

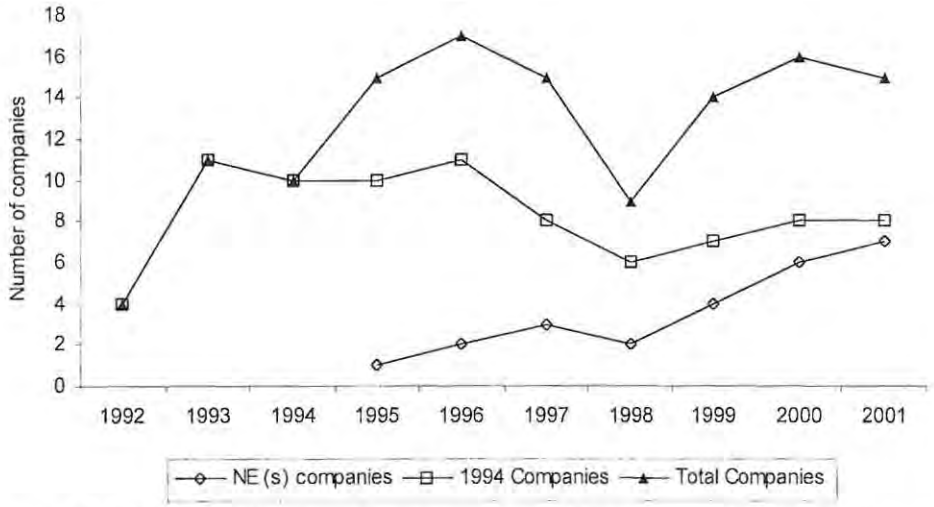


Figure A9.1: The distribution of new entrant and 1994 companies in the deepsea hake trawl fishery (1992 to 2001).
Data source: FIHB (1992 to 2002)

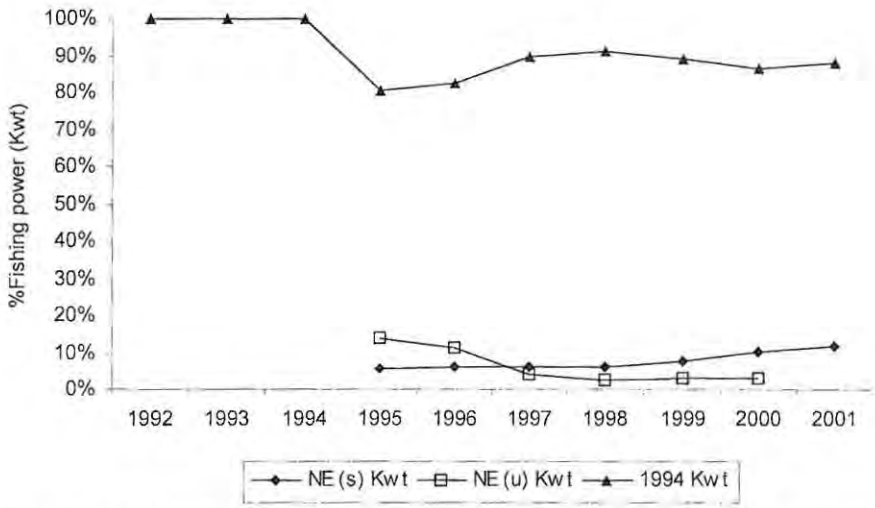


Figure A9.2: The distribution of fishing power (in Kwt) between new entrant companies and 1994 companies (1992 to 2001).
Data source: FIHB (1992 to 2002)

Table A9.3: Summary of the deep sea hake trawl fleet and quota shares.

		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Vessel (characteristics)	Length	52	53	53	53	50	51	55	50	49	48	
	Avg age	19	20	20	21	20	21	22	23	24	25	
	Avg GRT	701	763	762	801	759	789	878	750	715	724	
	Avg Kwt	1239	1322	1294	1323	1278	1314	1405	1316	1288	1310	
	Vessels	45	56	52	49	65	57	39	58	62	60	
	Fishers	1615	2070	1941	1897	2347	2147	1610	2092	2176	2085	
	Avg fishers	36	37	37	39	36	38	41	36	35	35	
Companies		4	11	10	15	17	15	9	14	16	15	
Concentration (fishing power)	Top 1	54.5%	50.5%	37.9%	28.9%	32.0%	45.8%	54.7%	43.0%	42.1%	43.8%	
	Top 3	94.6%	82.6%	80.6%	61.3%	63.2%	75.9%	90.5%	78.0%	77.5%	77.6%	
Concentration (Vessels)	Top 1	46.7%	39.3%	34.6%	26.5%	26.2%	33.3%	46.2%	32.8%	30.6%	31.7%	
	Top 3	95.6%	78.6%	73.1%	59.2%	58.5%	70.2%	84.6%	75.9%	72.6%	71.7%	
Quota Share (asset sizes 100 tons)	Total	1257	1311	1373	1307	1359	1408	1337		1295	1385	1362
	Average	41	40	43	42	32	24	23		23	25	27
	Std dev	119	115	117	119	102	88	84		75	80	79
	Highest	534	534	534	534	534	531	506		446	477	454
	Lowest	0.5	0.7	0.7	0.7	0.7	1.0	0.9		2.6	2.7	3.4
	Diff high & low	533	533	533	533	533	530	506		443	474	451
Quota holders		31	33	32	31	43	58	57	57	56	56	51

Data source: FIHB (1992 to 2002)

Table A9.4: Ownership (lessees) of vessels with deep sea hake trawl access rights by company name.

	1992		1993		1994		1995		1996		1997		1998		1999		2000		2001	
	V	L	V	L	V	L	V	L	V	L	V	L	V	L	V	L	V	L	V	L
I&J	21	923	22	1109	18	806	13	600	17	784	19	978	18	922	19	908	19	908	19	894
Sea Harvest	19	515	19	476	15	355	13	311	18	434	15	482	14	457	17	525	18	550	16	502
Marine Products	2	89	3	131	3	131	3	141	3	130	3	130			3	134	3	110	3	110
Visco See Produkte			1	40																
Surman Fishing			1	52	1	25	1	25	2	47			1	25	1	22	1	22	1	22
Viking Fishing	3	88	4	74	4	74	3	76	5	139	6	127	1	18	8	165	8	165	8	165
Altantic Enterprise Fishing			1	56													1	10	1	10
New SA Fishing Ent			1	33	1	30	1	30	1	30	1	30	1	30			1	30	1	30
Oosterlig Visserye			2	41			2	41	1	23										
Sistro Fishing			1	28	1	28	1	28	1	37	1	37			1	38	1	37		
Fenpar Fishing			1	30	1	30			1	22	1	22	1	22						
Atlantic Trawling					3	71	2	48	3	71	3	71			1	25			2	48
Neptune Trawlers					5	391	3	228	3	228										
Stella Offshore Fishing											1	50	1	50	1	50	1	50	1	50
Blue Continent Products															1	30	2	75	2	75
Siyaloba Trawling							2	100	2	100	1	50	1	50	1	50	1	50	1	50
Eyethu Fishing									3	59	2	47			2	47	2	47	2	47
MFV Emile Adriene Vessel Co																			1	32
Calamari Fishing																	1	24	1	24
MFV Augusta I Vessel Co																	1	16	1	26
Julius L W J											1	50			1	50	1	50		
Algoa Fishing							1	32	1	32	1	32			1	32	1	32		
Walker Bay Fishing							1	16	1	16	1	16			1	16				
Premier Fishing													1	36						
Cornelis Vrolyks Int											1	25								
Victory Fishing							2	170	2	170										
Overberg Trading									1	25										
Adventure Trawling							1	51												

V: Vessels, L: Fishers. Data source: FIHB (1992 to 2002)

APPENDIX A10: South Coast Rock Lobster

Table A10.1: Structure of the south coast rock lobster fleet.

		Fishing Season								
		1993	1994	1995	1996	1997	1998	1999	2000	2001
>18 to 20 (Medium)	Average length	19		19	19					
	Average age	6		8	9					
	Average GRT	70		70	70					
	Average Kwt	365		365	365					
	Vessels	**1**		**1**	**1**					
	Fishers	8		8	8					
	Average fishers	8		8	8					
>25 to 30 (Medium)	Average length	28	28	30	30					
	Average age	26	27	22	23					
	Average GRT	148	148	184	184					
	Average Kwt	429	429	558	558					
	Vessels	**2**	**2**	**1**	**1**					
	Fishers	45	45	25	25					
	Average fishers	23	23	25	25					
>35 to 40 (Large)	Average length	39								
	Average age	30								
	Average GRT	325								
	Average Kwt	626								
	Vessels	**1**								
	Fishers	24								
	Average fishers	24								
>40 to 50 (Large)	Average length	45	45	47	45	45	45	45	46	46
	Average age	26	22	22	25	23	24	28	29	30
	Average GRT	412	492	462	471	433	433	442	532	532
	Average Kwt	1001	1067	857	1004	981	981	1039	1125	1125
	Vessels	**6**	**8**	**7**	**9**	**5**	**5**	**4**	**5**	**5**
	Fishers	199	257	233	284	172	163	129	165	165
	Average fishers	33	32	33	32	34	33	32	33	33
>50 to 60 (Large)	Average length	57	57	56	57	56	54	57	56	56
	Average age	12	13	17	15	19	15	18	15	16
	Average GRT	565	565	549	565	549	515	565	547	547
	Average Kwt	896	896	945	896	945	858	896	822	822
	Vessels	**4**	**4**	**3**	**4**	**3**	**2**	**4**	**3**	**3**
	Fishers	134	127	95	128	95	64	131	100	100
	Average fishers	34	32	32	32	32	32	33	33	33

Data Source: FIHB (1993 to 2002)

Table A10.2: Owners (lessees) of south coast rock lobster access rights.

	1993		1994		1995		1996		1997		1998		1999		2000		2001	
	V	L	V	L	V	L	V	L	V	L	V	L	V	L	V	L	V	L
South Atlantic Fishing	4	133	5	162	4	130	6	171	2	64	2	64	1	36				
Hout Bay Fishing	3	110	3	108	3	108	4	133	3	96	2	65	3	96	2	65	2	65
Lusitania Fishing	2	60	2	60	2	60	3	92										
South Seas Trawling	2	28	1	20	1	8												
Baratz Fishing	1	25	1	25	1	25	1	25							1	25	1	25
Premier Fishing											1	32	3	96	4	132	4	132
Fernlene					1	30			1	32	1	32	1	32	1	32	1	32
Home Flower															1	36	1	36
Altantic Fishing									2	75	1	34						
Blue Continent Products							1	24										
Seafarer Distributors	1	30	1	30														
SA Sea Products	1	24	1	24														

V: Vessels, L: Fishers
Data source: FIHB (1993 to 2002)

Table A10.3: Summary of the south coast rock lobster fishery.

		Fishing Season									
		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Fleet characteristics	Average length	44	46	45	45	49	48	51	50	51	
	Average age	21	20	20	21	21	21	23	24	25	
	Average GRT	383	459	425	449	477	457	503	538	538	
	Average Kwt	786	904	809	896	968	946	968	1012	1012	
	Vessels	14	14	12	15	8	7	8	8	8	
	Fishers	410	429	361	445	267	227	260	265	265	
	Average fishers	29	31	30	30	33	32	33	33	33	
Companies		7	7	6	5	4	5	4	4	4	
Concentration (fishers)	Top 1	32%	38%	36%	38%	36%	29%	37%	50%	50%	
	Top 3	74%	77%	83%	89%	88%	72%	88%	88%	88%	
	Top 5	88%	90%	98%	100%	100%	100%	100%	100%	100%	
Concentration (vessels)	Top 1	29%	36%	33%	40%	38%	29%	38%	50%	50%	
	Top 3	64%	71%	75%	87%	88%	71%	88%	88%	88%	
	Top 5	86%	86%	92%	100%	100%	100%	100%	100%	100%	
Quota share characteristics	Average	75	64	54	53	34	33		19		15
	Std Dev	85	79	69	69	55	53		27		23
	Highest	226	221	204	202	187	181		130		101
	Lowest	44	43	12	12	5	5		4		6
	Diff high to low	183	179	192	191	182	176		126		95
Quota holders		6	7	8	8	12	12		20		16

Data source: FIHB (1993 to 2002)