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**ESS FISHERY PROFILES:**

**THE HAKE DEEPSEA AND INSHORE TRAWL FISHERY**

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## A. OVERVIEW

The purpose of this introductory overview is an attempt to contextualise the information and data presented in the report. Overall, this report on the South African ground fisheries attempts to provide a snapshot overview of the structure and function of the deep sea hake fishery and its associated by-catch as well as the dual quota, inshore hake and sole trawl fishery in 2000.

Collectively the trawl fisheries are the largest, the most valuable and in some instances the most sophisticated of all commercial fishing sectors in South Africa. Not surprisingly they are also operationally and structurally the most complex of all South African fisheries. The industry is characterised by a diverse range of business models from "catch and sell" operations to highly sophisticated, internationally competitive, vertically integrated food companies. To capture the full diversity of and within the industry is an extremely complex task. This report therefore only provides the most pertinent indicators of its current structure. Although the report was meant to provide a snapshot overview of the industry in 2000 it was fundamental to reflect on its origins and development over time to understand its current structure.

The deep sea and the inshore trawl fisheries share a common history and several companies are operational in both sectors in terms of fishing, processing and marketing of product. Perhaps one of the most pertinent observations, in contrast to all other fishing sectors in South Africa, was that the trawl fisheries did not develop along the normal trajectory from subsistence to small scale to a large-scale industrial fishery. Instead, from its early beginnings in the 1890s the trawl industry has operated as a "modern" fishery. Messrs. G.D. Irvin and C.O. Johnson pioneered trawling in South Africa and the history of trawling, processing, distribution and marketing of fish in South Africa up until around 1960 is reflected largely in the history of Irvin & Johnson (Pty) Ltd.

The historical development of the industry, exploitation patterns, management strategies and rights allocations can be broadly categorised into three major epochs. The pre 1977 era, the 1977 – 1992 era and the post 1992 (new dispensation) era. From its inception until 1977, despite certain checks and balances and restrictions, the industry operated largely as an open access fishery. Trawl fisheries are notoriously capital intensive and though many companies and individuals entered the fishery not many were able to survive. During the 1960s and 1970s catches by South African and in particular foreign vessels escalated to peak at over 1 million tons and in 1977 South Africa declared its EEZ, whereupon foreign vessels were excluded. A conservative stock rebuilding strategy was adopted and in 1979 individual quotas were introduced. These strategies had a stabilising effect on the industry and this contributed towards development of custodianship and co-management. In 1985 the Minister introduced policy to broaden access and this saw the number of participants increasing from the 7 in 1986 to 21 in 1992. The period 1992 to 2000 saw immense changes in the industry, brought about mainly by the development of the new fisheries policy that ultimately culminated in the promulgation of the Marine Living Resources Act (Act 18 of 1998). In particular, the post 1992 period is marked by the change over from quota allocation by the Quota Board to the Ministry, the short lived Fisheries Transformation Council, disruption of operations, loss of quota by the established trawling companies and the rapid entry of new participants from previously disadvantaged communities. During this period the number of participants in the deep-sea sector increased from 21 in 1992 to 56 in 2000. By contrast the changes in the inshore industry have been relatively minor and this sector experienced an overall decrease in the number of participants over the last 10 years.

Though there are several relatively "new" vessels in the deep sea and the inshore trawling fleets the average age of the vessels in both fisheries is 24 years. By international standards this is an old fleet. The reasons for this are attributed, in the main, to the short term and therefore insecure one year allocation of fishing rights. In 2000 there were 61 deep sea trawlers, ranging from ice vessels to freezer vessels to modern factory freezers, with a total capacity of 47978 GRT, total onboard hold capacity of 29480 tons, and a market and replacement value of R754 million and R2380 million, respectively. The majority of the deep sea fleet (83%) consisted of vessels less than 1000 GRT. In 2000 there were 29 inshore trawlers composed of smaller ice fish vessels, with a total capacity of 2390 GRT, total hold capacity of 710 tons, and a market and replacement value of R55 million and R183 million respectively. Given the many and diverse operational business models in the industry and the international quality demand driven nature of the larger and the vertically integrated companies it was not possible to comment on whether there is over-capacity or not. The findings in fact revealed that many vessels in the deep sea fleet operate at 27% below full catching capacity in order to ensure and maintain product quality and trip duration of ice vessels has been cut by up to 50% in order to maintain fish quality.

As mentioned above, the broadening of access has been an objective of the Department since 1985 and which has been pursued more vigorously since 1992. Though information is provided on the increase in the number of participants (3 in 1978 to 56 in 2000), this study did not track racial changes in quota or vessel ownership over that time but merely assessed the current situation. In 2000, 30% of the deep sea GRT and 33% of the deep sea proportion of the TAC was under control of previously disadvantaged entities (companies and or individuals), while the figures for the inshore trawl industry were 32% and 34%, respectively. It is important to note that three of the largest companies are subsidiaries of JSE listed companies (AngloVaal, Tiger Brand and FoodCorp). Therefore, the overall percent black ownership is expected to be greater than the figures provided above. An analysis of the percent of TAC held by the three founding companies between 1978 and 2000 has revealed that these companies have forfeited 42% of the TAC over this time period. This quantum was used to accommodate new entrants as well as the long line and handline hake fisheries.

With the exception of some independent small inshore trawler owners, employment in the industry is formal and in most instances is based on employment equity plans that are negotiated annually. Salaries are based on rank and years of experience. The trawling industry is the only South African fishing sector that provides formal employment, making it unique both in the local sense as well as internationally. All seagoing staff is paid commission, which is determined by quality and quantity and based on rank and years of experience. In 2000 the trawling industry employed 8838 persons, of which 92% were previously disadvantaged individuals (PDI) and 40% female on a payroll of around R428 million. The following figures provide a summary of the percent PDI employed and the percent of payroll received per division for the combined deep sea and inshore trawling industries.

Division	%PDI	% of payroll to PDI
Seagoing	97	93
Shore based	86	76
Processing	96	82
Marketing	43	21
Admin&Management	59	55

Largely because of the vertically integrated nature of the two largest companies the South African trawling industry has a very high ratio of seagoing to onshore employment of 1:3. This is significantly higher than the FAO figure for international trawl fisheries of 1:1 Overall the demersal industry also has a high jobs per hake ton quota ratio of 14.6 jobs per ton.

Strategically, demersal trawling is the most important fishing industry in the country. It is also the largest and accounts for approximately 50% of the wealth generated from South African marine living resources, with annual sales in the region of R1.5 billion that earns the country approximately R0.70 billion in foreign exchange. The industry is characterised by significant capital assets (ca. R3.2 billion at current values with a replacement cost of around R5.4 billion). Moreover, hake alone contributes approximately 50% of all fish consumed in South Africa at present. By implication therefore the trawling industry plays an important and strategic role in South African food supply and

security.

The composition of the catch varies between companies. To a great extent this mirrors the quantum of hake allocations per company; the greater the hake allocation the lower the percent by-catch. The percent by-catch of the 3 largest quota holders is <10% while the average of all others is around 38% (with some as high as 86%). This clearly indicates the different business models that companies have had to develop and adopt to remain competitive and viable. The bulk of the trawl hake catch (84%) is landed as fresh fish and in frozen H&G blocks, which undergoes onshore processing. The rest (16%) is landed as skinned and frozen fillets. Despite hake not being a superior fish (e.g. In comparison to cod) South African companies have developed a wide range of internationally competitive quality products.

The South African hake industry is also characterised by a unique and high degree of vertical integration. The reasons for this become evident when one examines the history of trawl fisheries in South Africa. As early as 1905 G.D. Irvine realised that the survival of the industry in the Cape would be entirely dependent on an efficient cold storage, distribution and marketing network to the Witwatersrand, which led him to acquire a cold storage company and scheduling the famous fish train to Johannesburg. Clearly this was a successful formula but required that the company be in full control of the supply of fish in order to deliver quality products to its customers on a consistent basis. This led to the future of vertical integration of fishing, processing, marketing and distribution operations. The ESS has found that the operation of the larger fishing companies is entirely market driven, meaning that processing of a particular line of product is determined by demand, which in turn dictates the catch rate of the trawling division and gearing of processing infrastructure. Because of the integrated nature of their operations these companies deploy their fleets in a balanced way to provide a controlled flow of the correct size of fish to onshore factories for steady year round output of a wide range of value-added, branded and packaged goods. To retain their internationally competitive status and contractual credibility requires exceptional quality control, to the point that it now involves meticulous organisation of catching, handling and processing operations. This further promotes vertical integration. Analysis of the flow of product has also shown that the majority of the small quota holders and new entrants are reliant on the pioneer companies for the processing and marketing of product and benefit from this relationship.

The concept of a Minimum Viable Quota has been examined carefully and for several economic reasons was found not to be a viable option for the deep sea and inshore hake trawling industry. Moreover, scrutiny of the concept has revealed that MVQ's could overload the system and produce the very instability that the Rights Allocation process wishes to avoid. A detailed discussion is provided in the report below.

One of the key issues of the study was to consider options for an equitable levy structure. From the outset it was assumed that the levy base would be restricted to the primary sector (up to the quayside). Given that fleet operations are integrated into different business models with varying emphasis on different markets, end products and intervening processes we found no quay level operational standard for the industry as a whole. The solution to the problem was to develop a realistic notional standard and it was agreed that this entailed an opportunity cost approach to the problem. A standard model for a notional H&G freezer trawler was developed; using verified calculated inputs and outputs. This required detailed information on vessel costs and revenues. For the most part the outputs of the model were governed by three important variables:- (a) conventional rate of return employed, (b) the valuation of capital and (c) hypothetical earnings and we developed sensitivity tables to capital employed (depending on the age of the vessel at acquisition) and to catch rate. The findings and options are presented in the section on levy options in the overall ESS report.

## B. SUMMARY KEY FACTS ABOUT TRAWLING

### Regional Factors:

- activity related to spatial distribution of hake
- **95%** of deep-sea hake landed in Western Cape
- **95%** of inshore hake landed in Western Cape
- **5%** of inshore hake landed in Eastern Cape
- hake trawling industry represents **0.75 %** of Gross Regional Product of the Western Cape
- hake contributes **a sixth** as much as agriculture and forestry combined
- purchase of goods and services from local suppliers = **R237 million** per annum

### The Fleet:

- deep-sea trawling fleet – **61 ships – 47978 GRT**
- inshore trawling fleet – **29 ships – 2390 GRT**
- **84%** of fish processed ashore
- Market value of deep-sea fleet – **R 754.1 million**
- Market value of inshore fleet - **R 54.7 million**
- Replacement value of deep-sea fleet - **R2.4 billion**
- Replacement value of inshore fleet - **R 183 million**

**Size and Scope:**

- demersal trawling accounts for ca. **50%** of the wealth generated from RSA living marine resources
- annual catches of **166700 tons** from a trawler fleet of 61 offshore and 29 inshore vessels

**Generation of Wealth:**

- annual sales of over **R 1.5 billion**
- total foreign exchange earned **R 0.70 billion**
- revenue generated for Government : **R 0.29 billion** p.a (all sources)

**Investment:**

- significant fixed capital assets
- **R 3.2 billion** at current values
- full replacement cost **R 5.4 billion**
- **45%** of replacement value comes in the form of ships

**Employment:**

- **8838** employed (distribution excluded)
- total wage bill **R 428 million** per annum - labour value added equal **40%** of output
- **100%** of fulltime employees on fixed salaries plus commission and incentive bonuses for some.
- fixed wage component makes up ca. **72%** of seamen's remuneration
- **Centralised Bargaining** structures introduced
- 3:1 ratio of shorebased to seagoing employment (consequence of processing and ship maintenance)
- very high by international standards – **FAO standard 1:1**. employment/hake quota ton = **14.6 jobs / ton**.

**Human Resource Development:**

- trawling provides **highest** quality employment of all RSA fishing sectors
- trawling is the only sector providing **formal employment** for all workers, land and sea alike.
- jobs are **permanent** and **non-seasonal** (unique in fishing)
- **union negotiated remuneration**, pension/provident funds, group life assurance, medical assistance, regular paid shore leave and annual holiday for all workers in deep-sea industry, including trawlermen
- fringe benefits of **R35 million**
- highly skilled labour force – **21%** fully skilled **45%** semi-skilled
- training and development expenditure **R 7.5 million** per annum
- support for community projects – **R 2.7 million** p.a.

**Products & Markets:**

- domestic market fully supplied – industry provides **75%** of fresh and frozen seafood consumed by South Africans.
- Approximately **60%** of landing destined for local market
- **45%** hake exported mainly to Europe, USA and Australia
- industry is main RSA exporter of perishable frozen products
- high degree of product innovation
- hake industry internationally recognised for innovation in processing, marketing and distribution.
- exceptionally broad product range **±100** packs locally available)
- marketing focus on adding value to landed hake h&g)

**Adding Value:**

- optimal added values means **branding** – effective branding implies **scale**
- all SADSTIA members have HACCP approval, permitting exports to USA and EU.
- investment in HACCP and product quality assets of deep-sea and inshore industry over **R110 million**
- labour content of processed products linked to market prices

**Transformation:**

- industry has reconstructed in terms of White Paper
- equity ownership of deep-sea trawling companies reconstructed
- "quota value" of affirmative investment **34%**
- affirmative ownership of GRT **31%**
- employee share participation schemes
- Black participation rising at all levels – **92%** PDI
- unskilled **99.5%** - semi-skilled **94%** - fully skilled **80%** - professional/managerial **65%**
- affirmative action by way of regional outsourcing = **R 34.5 million**.
- PDI make up **92%** of total industry staff
- **86%** of total industry payroll goes to PDI

**Associations:**

- two demersal trawling Associations
  - SADSTIA – **92%** of RSA registered demersal trawling fleet
  - SECIFA - **100%** of inshore quota holders and 6% of SA registered demersal trawling fleet
- representative bodies for trawler owners and operators
- emphasis on employment, efficiency and adding value to raw material
- recognised as representative industrial bodies by DEA&T

**1. History of hake fisheries**

Demersal trawling in South Africa started in the 1890's and has developed into the country's most important and mature fishing industry. From its early and modest beginnings the hake trawl fishery started as a "modern" and to an extent vertically integrated industry with trawlers, processing infra-structure and a well-organised distribution network. Overall the industry is highly capital intensive and is further characterised by the high rate of employment per ton of fish landed, the high degree of value adding to products, the development of globally competitive brand names and the well organised local and international marketing and distribution networks. The demersal hake fishery is traditionally split, according to various factors (species, geographical area, method, gear and vessel size), into four sub-sectors: deep-sea trawl, inshore trawl and more recently, hake-directed long line and hake-directed hand line. The deep-sea trawling industry is concentrated in the Western Cape and operates mainly out of Cape Town and Saldanha Bay, while the inshore trawl fishery is concentrated mainly in Mosselbay and Port Elizabeth. The longline fishery operates around the coast though most long line vessels are located in Cape Town. The handline fishery is concentrated in Mosselbay and Plettenberg Bay. To understand the interaction between these fisheries it is important to be aware of the historical origins and development of each.

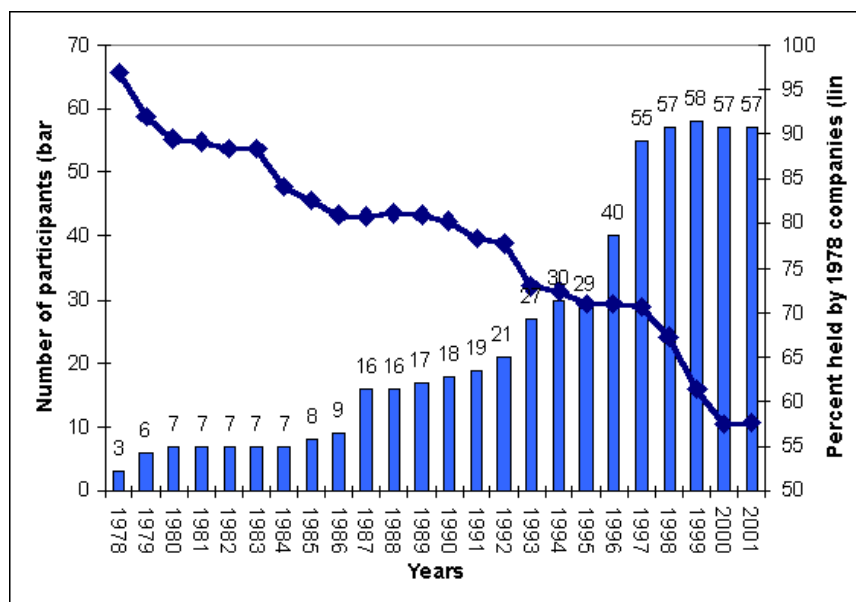
**(i) Deep-sea Trawling**

The demersal trawl fishery in South Africa started in the 1890s. At the turn of the century the fishery was targeting mainly Agulhas sole. Hake was only targeted when sole requirements were met and essentially landed as an incidental catch. For a period of about two decades Agulhas and West Coast sole remained the major target species (Payne 1995). To a great extent the founder of the hake trawl industry was G.D. Irvine, who launched into fishing (African Fishing and Trading Co.) with considerable financial family backing. However, within two years the company was insolvent. Irvine then went into a loose business arrangement with new capital provided by C.O. Johnson in 1907 but by 1908 they were again insolvent. This forced the two pioneers into a formal relationship and by 1910 their operation consisted of four vessels, a cold storage facility and a smokery. The widely published insolvencies discouraged others from entering the industry. By 1922 Irvine and Johnson registered as a public company with a fleet of 27 trawlers with additional interests in whaling and sealing. As early as 1905 Irvine realised that the survival of the industry in the Cape would be entirely dependent on an efficient distribution and marketing network to the populated hinterland. This led him to purchase Kalk Bay Fishing and Cold Storage Company. Later, I&J scheduled a regular fish train to Johannesburg, allowing for the systematisation of inland marketing. These strategic moves and the persistent and single-minded concentration on distribution and accessing outside markets was the key to the success of the company and its enduring dominance until around 1960. Several other fishing companies were established during these "formative" years but they too ultimately failed because of a reluctance to invest in processing and distribution. Very few fortunes have ever been made in fishing by merely catching the fish, and it is puzzling why others did not follow the example set by I&J.

It was not until 1961 that large new entrants appeared on the scene. Amalgamated Fisheries were the first, followed by Kaap Kunene in 1963. Both were absorbed into larger companies between 1967 and 1983. Sea Harvest was founded in 1963 and soon emerged as a major force by virtue of the capital resource base, as well as its marketing and catching capabilities but most importantly through its access to the distribution network of Imperial Cold Storage (ICS). Sea Harvest was the only new entrant that managed to establish itself permanently at that time. However, it took Sea Harvest about 10 years and substantial inputs into processing, branding and packaging to gain recognition for its products and to firmly establish itself on the local and later on the international market.

During the early 1960s the deep-sea hake fishery experienced unprecedented growth when foreign fleets discovered the rich grounds of the south-east Atlantic. Catches were uncontrolled and escalated rapidly, peaking at over 1 million tons per annum. Within a period of 15 years the stocks were decimated and in 1977 the fleet was landing primarily juvenile fish. South Africa declared its 200nm Exclusive Economic Zone in 1977. This finally resulted in the South Africanisation of the fishery. During the virtually open access "boom" period the emergence of other South African deep-sea companies diluted the dominance of Irvin & Johnson". In 1979 the Government in association with industry decided on a rebuilding strategy and introduced individual quotas. A conservative harvesting strategy was agreed upon which saw a 22% reduction in the TAC over a 5 year period. At this stage Sea Harvest purchased the 3<sup>rd</sup> largest company (Atlantic Fishing) so that the two largest companies (Irvin & Johnson and Sea Harvest) held 92% of the TAC.

In 1985 the Minister introduced a policy to broaden access and to de-concentrate the trawling industry as it then existed. Essentially this was achieved by defining a quota as a quantum rather than as a proportion of the TAC. Anticipating stock recovery, the Minister decided that 20% of all TAC increases were to be reserved for distribution to new entrants. These measures resulted in the erosion of the quota holdings of the founding companies by 42% over the period 1978 to 2000 (see graph below). The graph also shows how the number of deep-sea quota holders has increased during this period (from 3 in 1978 to 56 in 2000).



*The percent change in the quota held by the three founding companies between 1978 and 2000.*

The industry challenged the legality of the Minister's definition of the quota and this resulted in the appointment of the **Diemont Commission** in 1986. The Commission ultimately recommend that quotas be made freely transferable, that the process of quota allocation be removed from the political arena through the establishment of an independent **Quota Board**, and that long term rights be granted. Although the government subsequently introduced 15 year exploitation rights, in reality, the establishment of the Quota Board resulted in the perpetuation of quotas on an annual basis, thereby contradicting the Commission's stated objective of promoting the emergence of a true market-driven fishery via ongoing, transactable rights. Another paradox was that although the Sea Fishery Act of 1988 endorsed the conditional marketability of quotas, it failed to allow for divisibility of rights. This meant that while small companies could be bought up, the larger companies were not able to downsize and diversify (Bross 1999).

Property rights in the hake fishery were introduced at a time when stocks were in need of rebuilding. After establishing the EEZ in 1977 and given the small number of role players agreement between government and industry was easily reached, enabling a high degree of co-management with respect to stock assessment and management. The recovery after the "rape" period was remarkable and served to promote industry stability. Another major contributing factor was the establishment by government of a competent research organisation, backed by modern research and patrol vessels and large and well organised compliance and administrative sections.

In spite of the reluctance on part of government to introduce long-term rights, the oligopoly was entrenched, so that for all intents and purposes the companies enjoyed a high degree of security of tenure. This promoted a culture of custodianship over the resource, which has largely survived to the present. **It is of pivotal and fundamental importance for the sustainability of the resource that any new allocations policy does not erode the culture of custodianship.**

Since 1973 trawler owners and operators who hold a deep-sea quota are represented by the Deep-sea Trawlers Association of South Africa. The association is an industry service body and is recognised as an industrial body in terms of the Marine Living Resources Act, 1998. It serves the joint interests of all owners and operators of ocean going class trawlers. Given the need for co-management the Association interfaces with MCM as envisaged in Section 8 of the Living Marine Resources Act of 1998. However as a body representing fleet owners the Association also spends a considerable portion of its resources interfacing with other sectors of Government, such as,

- Establishing a Bargaining Council for the fishing industry in terms of the new Labour Relations Act and co-ordinates centralised bargaining for annual wage and conditions of employment negotiations with organised labour.
- Combining the Basic Conditions of Employment Act with Chapter 4 of the Merchant Shipping Act to create a new Bill (Dept of Labour)
- Liaising with SABS (and other bodies) to facilitate the practical and economic implementation local and international products standards (e.g. HACCP criteria, *codex alimentarius*)
- Liaising with Department of Finance on economic and historical research into the fuel taxation anomaly in the SA Fishing Industry.
- Financing, leading and participating in the activities of the Maritime Industry Training Board (budget R420000 pa). The Association employs a consultant to manage the fishing chamber of the Board and to integrate into the new structures under the Manpower Training Act (Transport SETA April 1999)
- Providing commercial sector advice to SAMSA and Department of Transport on various Maritime matters such as radio and safety regulations

On reflection it is clear that much can still be learnt from the early history of the industry. It is characterised by high risk, high capital requirements and, given the high number of companies that have come and gone, is not an easy business. Moreover, it is clear that success in this industry ultimately pivots around the efficiency of distribution and marketing.

## (ii) Inshore Trawling

The inshore trawl fishery is a dual quota mixed species fishery, and fishing effort is directed mainly at shallow-water hake (*Merluccius capensis*) and Agulhas sole (*Austroglossus pectoralis*). The inshore industry is based mainly in Mosselbay and Port Elizabeth, where it makes a significant contribution to the local economies.

The "inshore area" is generally described as the area between Cape Agulhas (20° E) in the west, and the Great Kei River in the east, and extending seawards to the 110 m depth contour. The inshore trawl permit describes the area as "waters between imaginary lines drawn due east from the mouth of the Great Kei River and due south from Cape Hangklip". The bay areas on the south/east coast have been closed to inshore trawling for over 20 years. Moreover, since 1978 deep-sea trawlers have been excluded from the inshore area, by condition of permit, from operating in waters shallower than 110 meters, east of Cape Agulhas (20° E).

Until the 1940's, the inshore demersal resources were fished by a small number of I&J trawlers based at East London, Port Elizabeth and Mosselbay. In the 1950's some private entrepreneurs converted small boats for sole trawling, and entered the fishery. By the early 1970's the inshore fleet of small trawlers had increased to approximately 60 vessels, based at Hermanus, Gansbaai, Mosselbay, Port Elizabeth and East London.

During the early 1980s the fishery entered a period of effort rationalization and quota amalgamation. In the period 1982 and 1989, economic and market forces resulted in some of the smaller operators leaving the fishery and by 1995, the sector had consolidated itself into 11 quota holders and 35 trawlers. The quota holding structure remained virtually constant until 2000, when two new entrants were granted rights through a process of internal reallocation. Currently there are about 30 trawlers operating in the industry. It is important to mention here the pivotal role played by the South East Coast Inshore Fisherman's Association (SECIFA). This association has continued to play a major supporting role in the management of all aspects of the fishery, particularly as regards mesh size (75 mm) restrictions, multi-species and by-catch controls as well as output (quota) control. Compliance, monitoring and control of the inshore hake and sole fishery are generally considered to be good. This is due to regional limitations (port controls, landing point restrictions) and the restricted areas including closed bays and reserves, the exclusion of deep-sea trawlers in areas < 100 m, limited effort (specifically with regard to vessel size and capacity). Recently SECIFA has also expressed its concern surrounding compliance within the emerging, and until now un-

regulated, hake-directed handline fishery.

All inshore trawling rights holders are represented by the South East Coast Inshore Fishing Association (SECIFA). The Association was formed in 1966, reconstituted in 1978, and is recognized as an industrial body in terms of the Marine Living Resources Act, 1998.

### (iii) Hake Longline Fishery

Longlining for demersal (deep-water) species was introduced in South Africa in 1982 with the aim to target hakes (*Merluccius paradoxus* and *Merluccius capensis*). In 1983, nine "experimental" longline permits were issued to established trawl companies that held hake quotas. In 1984-5 a unique double line technique was developed to cope with the hazards of strong currents, hard grounds, line breakage and harsh sea conditions. During this period effort moved to the South Coast where it was discovered that longlining was very effective for the catching of kingklip, *Genypterus capensis*. Kingklip catches were not restricted, while hake catches were offset against the quotas of rights holders. In 1985 an additional six longline permits (kingklip-directed) were issued to non-hake quota holders. Longline catches for 1985 totalled around 5000 t kingklip and 1500 t hake. The kingklip catches peaked at 11 370t in 1986 and thereafter showed a steep decline. By 1989 the experimental permits were replaced with permits that were limited to a kingklip TAC of 5000 t and the imposition of a closed season. This TAC was further reduced for the 1990 season, and by the end of 1990, the Department of Sea Fisheries stopped all demersal longlining. However some operators continued with hake "longlining" on the south coast using a loophole in the legislation. These operators were both "handlining", using lines with many hooks and also longlining under the shark longline loophole. Subsequent tightening up of legislation has now adequately addressed the problem. The hake directed experimental longline fishery was established in 1994. Initially a total of 4 000 t was allocated for an experimental fishery. On completion of the 1994 pilot study 4 400 t was allocated for the 1996 and 1997 seasons, with the only change being an additional 400 t allocated to the inshore group. Since then (1998 and 1999) the longline allocation has been contested several times (see later). In the 2000 allocation year, 5250 t was allocated initially and the balance of 4750 t was allocated (on appeal) as smaller quotas (33.8 t) to new entrants.

The longline fleet operates from a number of harbours, extending from Port Nolloth in the northern Cape to Port Elizabeth in the Eastern Cape. By year 2000, vessels were required to land catches in "home ports" and this reduced the number of "South Coast" landings significantly. Since 1998 the longline fleet has been issued either with "offshore" or "inshore" permits. The offshore permits allow for the deployment of a greater numbers of hooks, but vessels are limited to fishing in water deeper than 110 meters only.

Inshore vessels are allowed to fish in water shallower and deeper than 110 meters, but may only deploy a maximum of 4 000 hooks per day. Most of the permits issued are offshore. The inshore longline vessels are typically <15 m that had previously deployed < 4 000 hooks per day. However, for the years 2000 onwards very few (only a small number of South Coast operators) chose to activate rights on inshore permits. All the companies that returned ESS forms had rights issued in the offshore sector. In 2000 the longline vessels used their right to longline for between 1 and 7 months. The average duration of a trip in 2000 was around three days, largely as a consequence of the high quality demand of the PQ market.

To summarise: The longline hake fishery commenced as an experimental fishery between 1994 and 1997. Commercial-scale hake longlining started in 1998 with the allocation of individual rights and fishing occurred on both the South and West Coasts. The fishery is currently apportioned 10800t of hake from the global TAC per annum. The sector is unstable and characterised by legal interdicts against the allocation process and intermittent stoppages. The fishery is highly reliant on a seasonal export market to Europe and is vulnerable to extreme price fluctuations. Longlining is a labour intensive fishing method but little land-based value-adding occurs. Most of the hake is exported in gutted form, on ice and kingklip remains a valuable by-catch component of the fishery.

### (iv) Hake Handline Fishery

The origins of the handline hake fishery can be traced back to the late 1980's. There were many reasons for its development. Vessel owners and fishers who had traditionally targeted squid and linefish commercially explored the potential for alternative resources on the South Cape Coast as a "filler-in" activity when other species were "scarce". There was and still is a desperate need to keep vessels and crew economically active for as much of the year as possible.

Historically hake has always been caught by (traditional) handline fishers, but no real commercial value was attached to the species (due primarily to the value of other species). The development of a viable (but risky) market for PQ hake (fresh whole product on ice) predominantly to Spain changed the perception that commercial line fishermen had of hake. This led to a shift in emphasis to quality, packing, freighting and marketing of the species. Handline-hake was also historically caught in small quantities around the coast – mostly at times when cold water moved up the shelf bringing fish closer to the coast. The fishery developed, and for while was concentrated, in the Plettenberg Bay area where fish availability is good and the distance to the fishing grounds suited deck boat operation. In recent years ski boat operations have increased dramatically with both Knysna and Stillbaai becoming sizeable operational areas. Ski boats operating out of Mosselbay have also increased sharply. Operations are dynamic and mobile with boats moving to areas where fish availability is high e.g. from Mosselbay to Stillbaai. Handline hake operations have also developed in the Eastern Cape (Port St Francis, Jeffreys Bay and Port Elizabeth. Small amounts are also landed in Port Alfred).

The fish is caught by handline or rod & Scarborough reels and as any linefishery it is labour intensive. Associated with the development of the fishery was an increase in the associated infrastructure. Development of the hake handline fishery resulted in logical extensions and growth of land-based primary processing / packaging facilities. Included in the necessary changes for fresh hake was the upgrading of factories and vessels to EU-approved standards (HACCP). An important offshoot of these developments was the increase in local employment and the knock-on effect to the regional economy.

Currently a total of 5 500t of hake per annum is held in reserve from the global TAC to account for catches made by this sub-sector. Since the origin of the fishery in 1980 it has grown without much control and verifiable landings now approximate 4 500 t. The amount that is unreported probably exceeds 500 t. Effort limitations will have to be introduced to ensure that the handline reserve is not exceeded. Alternatively a greater allocation to this sector will have to be made, but this would obviously have implications for the other hake directed fisheries.

The fishery was started at a time when the old Sea Fisheries Act of 1988 was in force. The growth of the fishery was well known to Sea Fisheries from its onset and although operating legally under the 1988 Act concern has been expressed by industry, scientists and managers as far back as 1990, re. its development and stock implications. Because of permit extensions and the expiry of the transition period between the 1988 and 1998 Acts the fishery is currently operating in a legal vacuum. This uncertainty has resulted in the following:

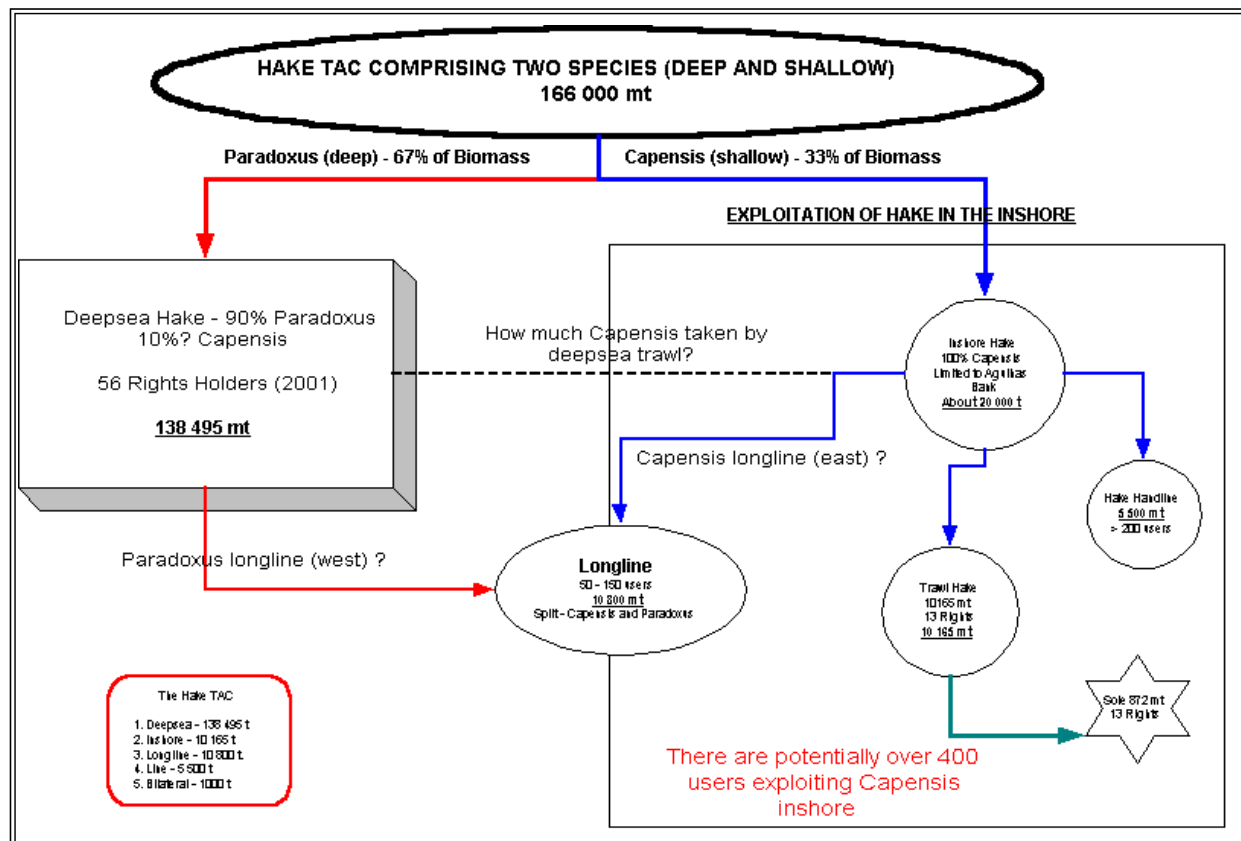
- Continued growth and development of the handline hake fishery
- A reluctance by enforcement officers to control the fishery – with regard to both the commercial and recreational components in terms of the old and new Acts
- An unprecedented increase in the number of ski- and deck-boats targeting hake with subsequent difficulty in estimating the actual catch
- Increasing concern by other hake fisheries about stock implications and the consequences of uncontrolled growth of handling.

A peculiarity of the fishery is that many operators are retrenched or displaced whites (mostly through affirmative action) and who have now invested their packages in fishing. There are few Previously Disadvantaged (Coloured and Black) boat owners. The involvement of PDI is mostly through employment on boats in which irregular incomes are made (weather and fish availability dependent). Many PDI fishers are from the local communities, although most of them are from the former homelands or the Western Cape.

**Conclusion**

The hake fisheries are to a large extent interlinked by way of catch and processing agreements, shareholding and quota exchange, amongst others. It has however become clear from the ESS that the deep-sea sector, followed closely by the inshore trawl sector, provides far greater social and economic security and benefit than do the longline and the handline fisheries. Essentially this is a consequence of the formal and permanent employment offered by the trawling sector. By contrast the longline and handline fisheries are seasonal, catches are erratic, employment is temporary and crew and skippers (if not the boat owner) are paid for what they catch. From its origins the deep-sea sector has been a "modern" fishery (catching, processing, marketing and distribution) and the pioneer companies, particularly the two largest quota holders, provide the backbone of the South African fishing industry. Secondary processing and branding is to a large extent restricted to the "pioneer companies". Any major shift in allocations policy within the deep-sea sector must analyse and consider seriously possible social and economic knock-on effects from a local, regional and national perspective.

The current structure and TAC allocations per sector, quota holders per sector and the species breakdown are illustrated in the following figure (acknowledgements to Dave Japp).



## 2. Management of the resources

As mentioned previously the hake fishery is the largest and most valuable of our fisheries. It is also recognised that the South African hake fishery is one of the best managed fisheries in the world. Through good compliance, a sense of ownership and a conservative co-management strategy in the past the resource is being rebuilt after the "rape" in the 1960s and the 1970s.

The fishery is based on two hake species, the shallow-water (*Merluccius capensis*) and deep-water (*M. paradoxus*) Cape hakes. At this stage catch statistics are not species-disaggregated. Consequently, the assessment methods applied in the past have, of necessity, treated the two hakes as a single species.

The hake resources on the west and south coasts are assessed separately, but a global TAC is set. The allocations to smaller, inshore operators are generally taken close to their base of operations, and the offshore operators are requested to manage their fishing activities such that the global TAC is apportioned between the west and south coasts in a 2:1 ratio. This arrangement is as effective as area specific TACs, but easier to manage.

The hake fishery has been managed by an OMP since 1990. In 1998 the OMP has had to be revised, partly because:

- i. the observed catch per unit effort (CPUE) on the west coast had not increased as much as predicted and there was some evidence of model miss-specification. In addition the observed CPUE from the commercial fleet was showing a lower and near-discrepant trend compared to surveys and;
- ii. the CPUE time-series for the commercial fleet was standardised by applying power factors. This is a fairly crude way of standardising CPUE data and, in keeping with the modern trend internationally, the CPUE time-series needed to be improved by applying modern general linear modelling (GLM) standardisation techniques. This process also brought to light the necessity for adjusting for a change in the age-specific selectivity of the fleet over recent years, probably as a result of phasing out the illegal practice of using small-mesh net-liners.

The key data on which current assessments are based are:

1. Annual nominal catch for 1917-1998 on the West Coast (fig 1a) and 1967-1997 on the South Coast (fig. 1b)
2. Historical CPUE standardised by power factors pre 1978 (fig. 2).
3. GLM-standardised CPUE data post 1978 (fig 2a & 2b). For the West Coast this is split into two series (1978-1986 and 1993-1998) to account for changes in fishing selectivity.
4. Relative biomass indices with the associated standard errors. Summer (1985-1999) and winter surveys (1985-1990) on the West Coast, and spring (1986-1995) and autumn (1988-1997) on the South Coast.

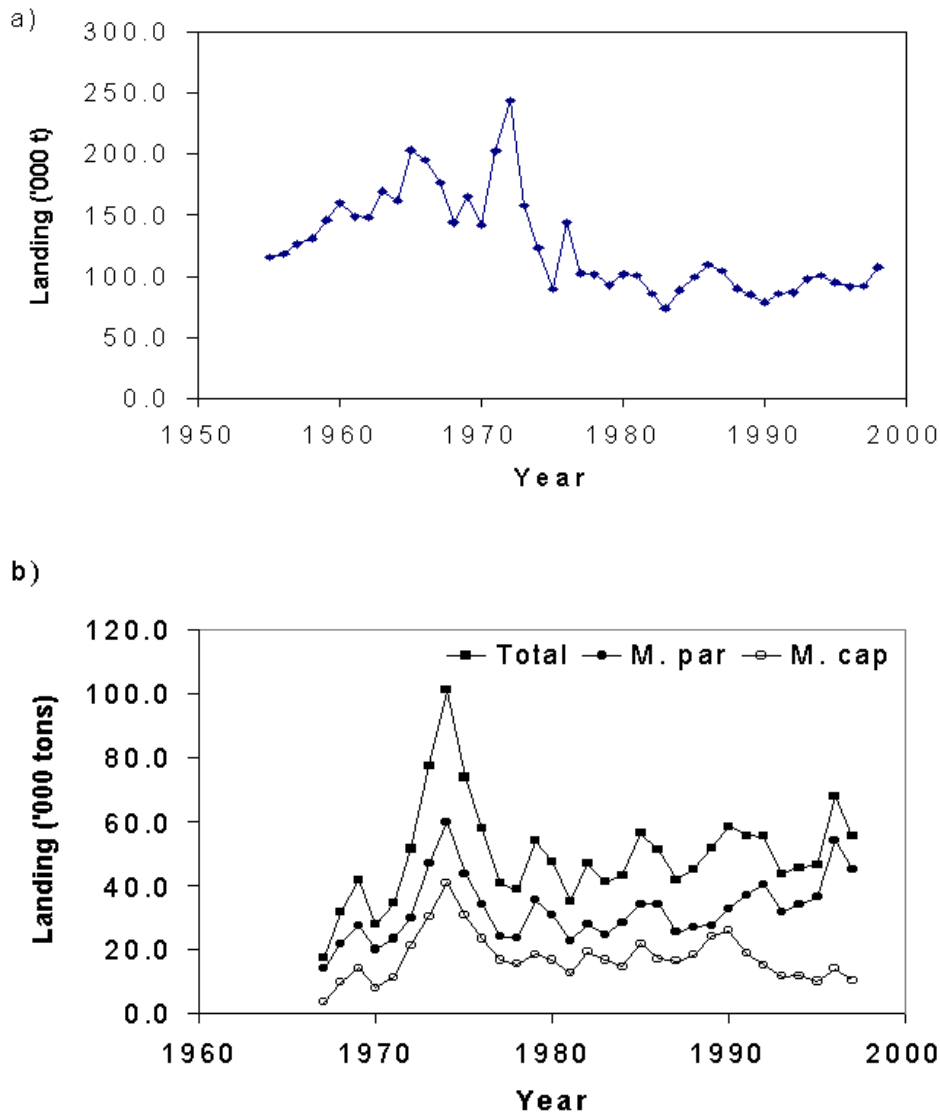
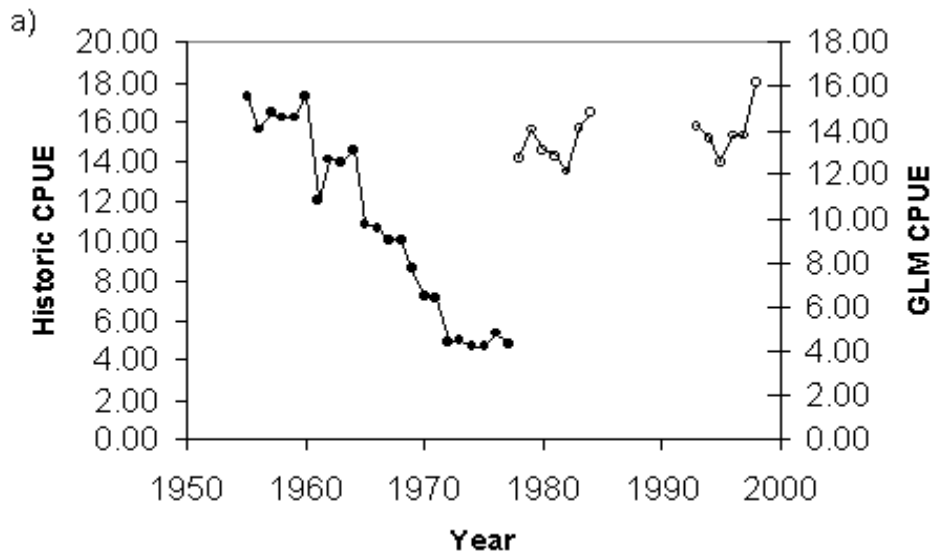
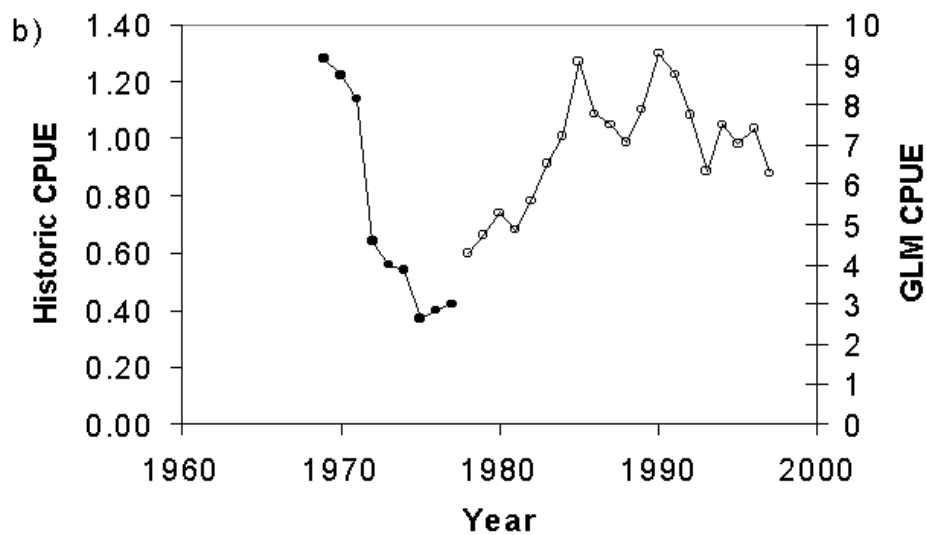


Figure 1. Annual landings of Cape hakes on the (a) West Coast and (b) South Coast.





**Figure 2:** Historic CPUE series standardised by power factors (solid circles) and GLM-standardised CPUE (open circles) for the (a) West Coast and (b) South Coast. Note the historic and GLM CPUE series do not have the same units and are not directly comparable.

The new OMP adopted for the West Coast is based on a Fox form of the surplus production model with an  $f_{0.75}$  harvesting strategy. For the year 2000, the OMP indicated a 3% increase in the West coast component of the TAC (103 000 tons). Provisional results from the revision of the South Coast OMP indicated similarly that the hake stocks on that coast could also accommodate an increase of 3% (52500 tons). Consequently, a combined TAC of 155 500 tons was set for the year 2000, with the recommendation that it be caught on the West and South coasts in the approximate ratio of 2:1.

It is important to stress that the approach underlying the west coast OMP, which accounts for the greater part of the overall hake TAC, is a constant fishing effort strategy. This means that when the resource size increases (or decreases), the TAC is moved up (or down) in proportion, with the aim that the same number of vessel-fishing-hours as the previous year will be required to take the catch. In other words, a change in abundance is accompanied by a proportional change in catch rate and TAC so that the adjusted TAC will be taken without adjusting the amount of fishing effort. Thus the recommended 3% increase in the hake TAC for 2000 does NOT mean that there is scope for a 3% increase in the number of vessels active in the fishery - to the contrary, MCM scientists have indicated that there is currently no scope for an increase in trawling effort.

Moreover, the introduction of the formal longline hake fishery and the presently uncontrolled and rapidly increasing hake handline fishery further complicates the setting of the TAC for the South Coast and also highlights the need for

- (i) separate assessments for the two hake species.
- (ii) assessing the differential effects of trawling, longlining and handlining on inshore hake, *M. capensis* to develop an allocation strategy for the three hake fisheries for the continued sustainable management of the resource.

In the 1970's, after a scientific assessment of the sole resource, scientists raised concerns about the increase in inshore trawling fishing effort. A global sole quota of 700 tons was introduced in 1978, linked to the introduction of the 110m depth limitation, which separated the inshore fishery from the deep-sea fishery. Also, in 1978 the inshore hake catch was controlled for the first time with the introduction of an allocation of 7 000 tons (approximately 6% of the TAC). The allocation and enforcement of both a sole TAC and a sector hake allocation created problems. There were simply too many boats competing for a fixed quantity of sole, which resulted in the TAC being filled in five months. Negotiations between government and industry (1979 to 1981) led to the introduction of the individual quota system. Over the period 1982 to 2000 the number of trawlers in the Inshore Industry has been reduced from 54 to 30 trawlers.

There are several unique intra-inshore industry management measures that have evolved since the introduction of the sole TAC and a hake allocation in 1978. One of the important measures is the temporary within and across sector exchange of quota between quota holders, within a calendar year. The within sector exchange allowed for a better use of the sector hake and sole allocations and simultaneously to achieve a balance in the catching of the two quota species in a dual quota fishery. The between sector exchange was instituted because of annual variability of catches by the deep-sea and inshore fisheries and allowed for the full utilisation of quotas. Moreover, quota holders are also permitted to assist each other to smooth out factors such as vessel breakdown, industrial action and insufficient quota. MCM Mosselbay and Cape Town administer these processes. The measures allow relatively "unrestricted" fishing for a full "quota year" to maintain industry stability, to maintain viable catch rates and to reduce trawler impact on the inshore demersal resources and nursery areas and overall to support fishing effort control and to ensure good fishing practice and have contributed enormously to establishing one of the most stable fisheries in the country.

The sole resource, as mentioned above, is also managed by TAC. The resource has been assessed since 1989 using an ad hoc tuned Virtual Population Analysis (VPA). The reliability of the model has been in doubt for many years since it fits poorly to the CPUE and to the survey data. Since 1992 a constant TAC of 872 tons has been recommended, and the VPA has been applied simply as a monitoring tool. The 1999 and 2000 assessments continue to show a declining trend in the estimated biomass of fish 3 years and older, but the rate of decline is slowing down. Processors have also dropped the price of "slips" to such a level that trawler skippers avoid the nursery areas.

## Conclusions

- The demersal fishery, and in particular hake, is the largest and most valuable in South Africa.
- As a consequence of severe over exploitation of the hake resource in the 1960s and 1970s the industry and MCM have committed themselves to a conservative rebuilding strategy.
- This strategy has led to the recognition that the South African hake fishery is one of the best managed fisheries in the world.
- The recommended increases in the TAC are based on a constant fishing effort strategy.
- The introduction of the longline fishery and the recent uncontrolled development of the handline fishery requires careful consideration of the allocation procedure per fishing sector and has highlighted the need for separate assessments of the *M. paradoxus* and *M. capensis* stocks.

### 3. Allocation and distribution of hake rights: Fishing Seasons 1991-2001

#### Allocating Bodies 1991 – 2001

Shifts in allocating authority has complicated the allocation of rights in the period under review. The Sea Fishery Act of 1988 tasked the Quota Board with the responsibility for allocating quotas (i). The Board functioned for nine seasons under four different Chairmen. The Marine Living Resources Act (18 of 1998) abolished the Board and placed the responsibility for allocation directly on the Ministry. The Act gave another agency, the Fisheries Transformation Council, a subsidiary role in allocating fishing rights (ii). The transition to the MLRA regime was subject to hiatus in that, in effect, the 1999 allocation had to be conducted as if the Board undertook it. This meant that the Department was only able to allocate long term rights independently for the first time in the 2000 season. The task proved to be more complicated than expected and in the event rights were actually allocated short term. The next year, 2001, was governed by an amendment to the Act that temporarily abolished the power to redistribute fishing rights.

#### Sectoral Division in the Hake Fishery in the 1990's

It is difficult to understand redistribution of rights in the trawling industry without considering the simultaneous inter-sectoral redistribution of the hake resources. From the very inception of the Quota Management System (1979) hake trawl fisheries consisted of distinct deep-sea and inshore subdivisions. Their relative size has been basically fixed at approximately 92.5 to 7.5 since 1983.

Since 1979 "Bilateral" (foreign) allocations made up the remainder of the TAC. Bilateral hake quotas were in effect amounts that the RSA Government made available for foreign fishing nations usually as a *quid pro quo* for favours during isolation. They were quite substantial at one stage but were phased out by 1992 (except the newly created Mozambique quota of 1000 tons, which has remained on the books up to the present).

The long lining that occurred between 1983 and 1990 never constituted a clear subdivision of the hake fishery within the existing Quota Management System. The Minister, who had effectively declared an emergency with respect to kingklip, terminated hake long lining in the course of 1989/1990 (iii). A spate of illegal long lining took off during 1991/2. This can be interpreted in several ways but to a certain extent this phase amounted to a campaign of defiance largely on the part of established tuna fishermen who were aggrieved because they were unable to catch hake when tuna fishing was slack. The Authorities failed to exert any realistic control of the situation and instead decided to conduct a "hake long line" experiment, 1994-1996. In effect this led to the re-introduction of hake long lining mainly at the lower end of the scale. Upon its successful conclusion the Department set aside an amount of 4400 tons within the TAC for allocation to a formal hake long lining industry in 1998 (iv).

A limited amount of hake hand lining, generally considered to be of the order of 1500 tons, has taken place in the south-east coastal region as far back as anyone remembers, but took some shape in the late 1980s. The catch was thought to have grown to almost 2000 tons by 1993/4 and to around 4500 tons in 2000. At first, hand lining was not recognised as a formal subdivision of the hake fishery, although provision for the catch was included in the calculations determining the TAC, right up to the establishment of a formal fishery in 1998. Despite the fact that the hand lined estimate was traditionally taken into account each year the actual catch fell outside of the official hake TAC. The fishery, which was formally established 1998, was unique in another way in that it still appears to be subject to a kind of "global quota" (v). Currently a total of 5 500t of hake per annum is held in reserve from the global TAC.

In summary present day South African hake fisheries can be subdivided into five sectors as follows:

HAKE SECTORAL ALLOCATIONS	Year established	% of TAC in 1991	% of TAC in 1994	% of TAC in 2000
DEEP-SEA TRAWLING	1979***	89.5%	91.3%*	83.3%
INSHORE TRAWLING	1979	7.0%	6.6%	6.1%
FOREIGN TRAWLING	1980	3.5%	0.7%	0.6%
LONG LINE	1998	0%	1.4%**	6.4%
SET ASIDE FOR HAND LINING	1998	0%	0.0%	3.5%

\* The apparent reversal of the long term trend is attributable to the fall in foreign allocations

\*\* Experiment

\*\*\* Establishment dates refer to the year in which quotas were introduced

#### Hake Trawling allocation in the 1990's: the Quota Board Era

***The chronicle set out under this heading is best read in conjunction with [Table 1](#).***

*SECIFA is omitted from the discussion mainly because the allocating authorities customarily left the relative position of the inshore trawl fishery and its constituent quota holders (almost) entirely alone throughout the period (vi)*

1991 – There were 18 deep-sea rights holders when the Quota Board first sat and some 3000 tons were available for redistribution (vii). The State applied 1300 tons to new "bilateral" or foreign allocations and the Quota Board restricted itself to "addressing existing anomalies". It awarded 1200 tons to the smallest of the established trawling companies (viii) and allocated 100 tons each to four small existing holders and a new entrant.

**1992** - The Board undertook an investigation of "the basis for allocating quotas" and failed to make a full and timely allocation. Two very small entrants were allocated (ix). The Board was left with approximately 5000 tons available for distribution at year-end together with the possibility that it would not be caught (x). Having failed to act in time the Board instructed the Department to let this mass go to existing quota holders as a "temporary allocation" (xi).

**1993** - The 1993 season provided the first real opportunity for the Board to implement any kind of transformational policy because for the first time applicants with historically disadvantaged credentials coincided with a distributable surplus. Using 1991 as the base year the Board allocated 7350 additional tons for the 1993 season of which 2900 were derived from the final exclusion of foreigners from the hake trawl fishery (xii, xiii). Besides relatively minor adjustments to new entrants introduced by the Board, four 1000 ton quotas were allocated to four nominally Black enterprises. 3000 tons were allocated to Community Trusts (xiv).

**1994** - The TAC increased by 3000 tons. The Minister held 2000 t in reserve for a hake longlining fishing experiment. The Board made a technical adjustment to an existing quota holder and applied the remaining 951 tons to the Community Trusts. Later it issued another 2000 tons for community trusts then (carried forward from the previous year?) with the result that the 1994 TAC was nominally oversubscribed.

**1995** - Again the TAC increased by 3000 tons but it was withdrawn from the ambit of the board (xv). In terms of the Guidelines nothing was available for redistribution in 1995 for which reason the Board Chairman (Judge Levy) dispensed with hearings and re-issued existing quotas.

**1996** - The TAC was unchanged. The annulment of Community Trust allocations freed up 4463 tons, which the Board allocated to 13 new quota holders, the majority transformational in nature (xvi).

**1997** - This season marked the start of a controversial and rancorous phase for all stakeholders involved in the hake rights allocation process. The TAC had remained unchanged at 151000 tons for two years (and, crucially, was to remain so for another two) (xvii). A poorly considered action on the part of the Quota Board provided the trigger for the kind of disputes that came to characterise hake allocations for some years to come. The Board deducted 4% from all 1996 hake quotas and distributed the 5724 tons "freed up" in this way to selected small quota holders and 15 new entrants. This action violated the Guidelines and appeared *ultra vires*. The industry considered an interdict to prevent the new holders from exercising their rights with a view to testing legality later. A high court judgement in an entirely different fishery appeared to vindicate the industry and induced the Authorities to settle virtually at the courtroom steps. The Minister provided the Board with another 5000 tons and this amount was distributed proportionately to all existing holders compensating for almost all the initial losses (xviii).

**1998** - Both the Board and the Minister withheld substantial quantities of fish from the trawling industry --- 14000 tons and 10000 tons respectively, each with a view to making supplementary allocations later. However at this juncture the Board was being steadily overwhelmed by actual and potential lawsuits emanating from other sectors of the fishing industry (xix). After being pressed with the prospect of more litigation in circumstances under which it failed in one case after another the Board retracted and decided to allocate the full 140000 tons available to it in accordance with its Guidelines. In respect of the 10000 tons blocked by the Minister, the industry conceded that he could rightfully withhold 7900 tons. The Board then distributed the balance largely in accordance with its Guidelines (xx). The upshot was that quotas were allocated in three tranches and in the end an effective 4.6% of the TAC had passed from hake trawling to hake lining.

#### An anomalous Allocation

**1999** - The MLRA was promulgated in October 1998. Initially the Minister determined that in terms of #14 of the Act the allocation to the trawling industry would be reduced by 25% (xxi). In the event the mechanisms needed to implement the new policy were unready by the start of the season and no rights were issued by year-end. An exemption intended to maintain fishing was withdrawn 6<sup>th</sup> January 2000 and trawler fleets were recalled from sea. Events conspired to idle a workforce of more than 10000. Within ten days the Department had implemented a makeshift bridging arrangement aimed at keeping the larger processors (only) fishing until May or June --- other participants continued to lie up while hake rights issues continued to be addressed.

A benchmark rock lobster case (*Langklip; May 10<sup>th</sup> 1999*) fundamentally affected the way in which the new Act could be applied. The Ministry was obliged to effect the transitional arrangements enshrined in the Act, which meant adhering scrupulously to the procedure under the old Act. The significance of this decision was that the work carried out up to that stage was set aside and the allocation would have to proceed on the same principles and procedures as the Quota Board would have applied sitting with an unchanged TAC. Nevertheless, the Department was adamant that redistribution would occur. It also appeared that Government had reservations about the import of the Langklip ruling.

The deep-sea trawling industry decided to make a conciliatory gesture notwithstanding the legal position of former quota holders. Parties previously holding in excess of 1000 tons collectively offered 10000 with the intention that the mass of fish be used to effect Transformation as envisaged in the MLRA. Access rights distribution for 1999 fell under a formal settlement between various stakeholders and Government --- an additional 4000 tons went to longlining and 3000 tons to smaller deep-sea rights holders and 3000 tons to new trawling participant (xxii).

#### Hake Allocations under the MLRA dispensation

**2000** - The first allocation implemented purely under the MLRA occurred in a year in which the overall TAC also increased. The actual process that took place was difficult to understand. The first allocation (13<sup>th</sup> Jan) was withdrawn, softened quite significantly and re-published (28<sup>th</sup> Feb). It can be inferred from the final results that the relevant committee set the events of 1999 aside and used 1998 as a base year. It is apparent that the three largest quota holdings were reduced by 12% and quantum was redistributed largely to a wide spectrum of smaller enterprises.

Analysed in this way the following general picture emerged:-

<b>source</b>	<b>reduction in large trawl rights holders</b>	<b>12500t</b>
	<b>increase in TAC</b>	<b>4500 t</b>

<b>application</b>	<b>increases for smaller trawl rights holders</b>	<b>7250 t</b>
.	<b>one new entrant</b>	<b>750 t</b>
.	<b>increase for long lining</b>	<b>5500 t</b>
.	<b>increase for hand lining</b>	<b>3000 t</b>

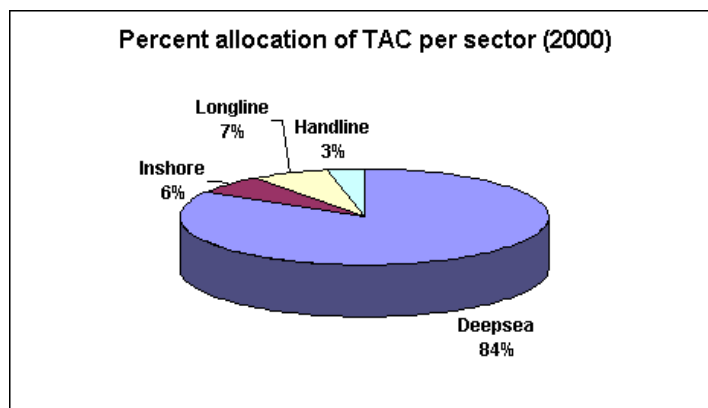
Compared with the year immediately past the losers seemed to consider the losses unbearable. A minor change also occurred in respect to inshore trawling rights in that two small entrants were sanctioned.

2001 - The TAC increased substantially. Subsequent to the allocations for 2000, the Department found itself at a point at which an unavoidably time consuming re-assessment of the access rights allocation process was necessary. The Act was consequently amended so as to permit a one-year rollover of all rights (xxiii). In effect access rights, properly defined with reference to any given TAC remained entirely unchanged.

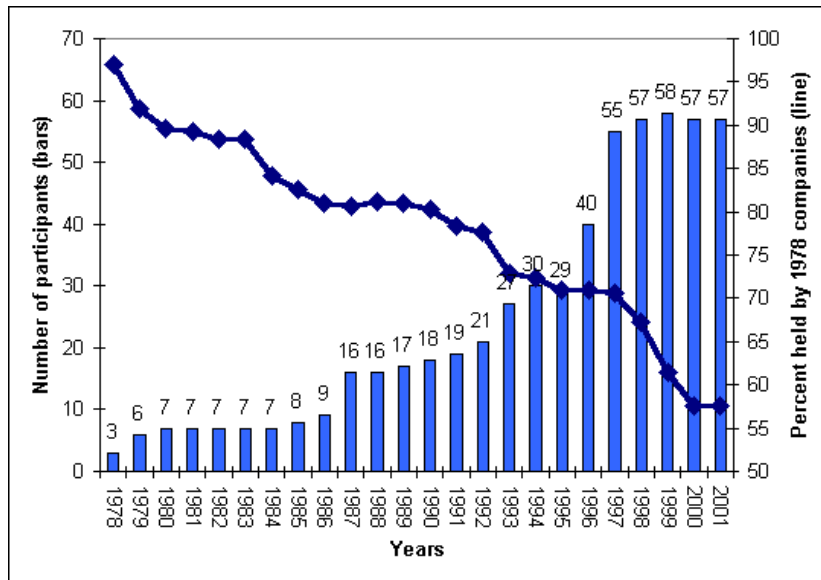
TRAWLING RIGHTS	1991		1995		2000	
	no.	%TAC	no.	%TAC	no.	%TAC
ESTABLISHED TRAWLING COMPANIES	5	84.3%	5	78.7%	5	64.8%
PRE QUOTA BOARD ENTRANTS 1984-1990	13	5.13%	12	5.17%	12	4.85%
QUOTA BOARD ENTRANTS	1	0.07%	8	3.03%	26	11.2%
MLRA ENTRANTS	-	-	-	-	5	2.36%
ESTABLISHED SECIFA MEMBERS	11	6.97%	11	6.51%	11	5.88%
SECIFA MLRA ENTRANTS	-	-	-	-	2	0.23%

TABLE 1 and TABLE 2 show the allocations per company and per quota holding group for the period 1991 to 2001.

The proportional allocation (%) per sector of the 2000 TAC is illustrated in the pie diagram below.



As mentioned previously the number of hake trawl quota holding entities has increased from 3 in 1978 to 57 (56 plus SECIFA) in 2000. Moreover, as described elsewhere certain proportions of the TAC have been set aside for the longline and handline hake fisheries. The results of the analysis of change in the proportion of the TAC held by the three founding companies (I&J, Sea Harvest and Atlantic Fishing) (see graph below) shows that they have forfeited approximately 42% to accommodate new entrants and the new fisheries (longline and handline).



Increase in quota holding entities and fall in TAC controlled by founding companies (1978-2001).

4. Control of quota 2000

a. Deep-sea quota

Analysis of the current quota holdings has been undertaken in two ways. Firstly, where control of the quota resides outside of the designated rights holder the quota holders have been consolidated with the controlling entity, **irrespective of the racial composition of the companies**. This analysis (shown in the table below) reveals that 89.3% of the deep-sea proportion of the TAC (129520 tons) is controlled by "Historical participants, and 10.7% is controlled by "New participants". In this analysis we divided the quota holders into four categories on the basis of the size of their allocation.

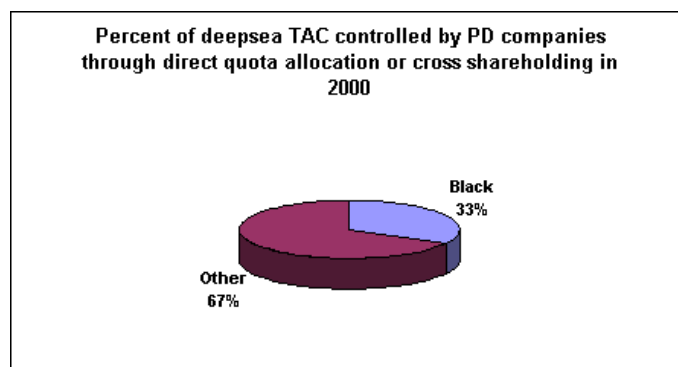
DISTRIBUTION OF DOMESTIC ALLOCATION OF DEEPSEA TAC (2000)

	HISTORICAL PARTICIPANTS			Percent of TAC (2000)	NEW PARTICIPANTS			Percent of TAC (2000)
	Number	Tons			Number	Tons		
Category A 1*	2	89451.0		69.1	Category A 2	0	0	0
Category B 1	6	18748.1		14.5	Category B 2	1	1500.0	1.16
Category C 1	3	2778.0		2.1	Category C 2	3	2750.0	2.12
Category D 1	10	4629.6		3.6	Category D 2	23	9663.0	7.46
<b>TOTAL</b>	<b>21</b>	<b>115606.7</b>		<b>89.3</b>		<b>27</b>	<b>13913.0</b>	<b>10.7</b>

\* = Majority share of I&J and Sea Harvest is held by listed companies, viz. AngloVaal and Tiger Brands, respectively.

Categories	
A	> 10,000 mt
B	1500 to 10,000 mt
C	750 to 1500 mt
D	< 750 mt

Secondly the deep-sea quota holdings were analysed on the basis of percent ownership of companies or shareholding in historical fishing companies by previously disadvantaged entities (companies or individuals. This analysis (see graph below) shows that 33% of the deep-sea proportion of the hake TAC is held by PD individuals or companies.



Notes:

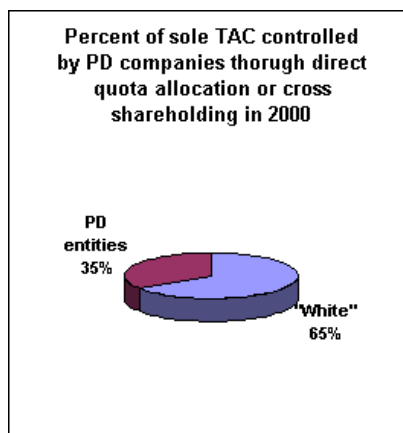
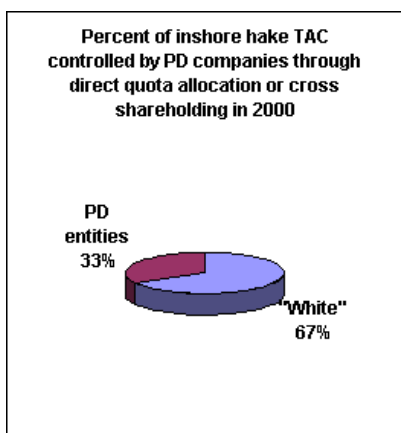
1. Coverage:

Total number quota holding entities in 2000 = 56  
 Total number for which ownership data was available = 52  
 Total deep-sea TAC for 2000 = 129520 tons  
 Total deep-sea TAC for which "ownership" was known = 127852 tons (= 98.7%)  
 PD individual or company "owned" quota in 2000 = 42732.7 tons

2. The holding companies and majority shareholders of the two largest quota holders, I&J and Sea Harvest Corporation, are listed companies that hold 80% and 72% respectively. It is therefore not possible to accurately calculate the percent of the deep-sea hake quota controlled by previously disadvantaged individuals or companies. If anything the proportion of quota controlled by PD entities will be higher than illustrated here.

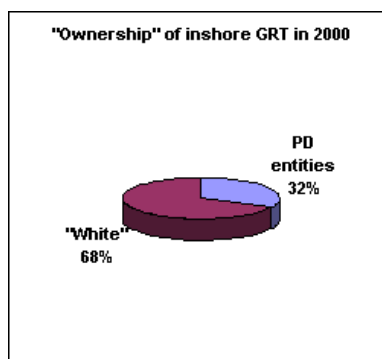
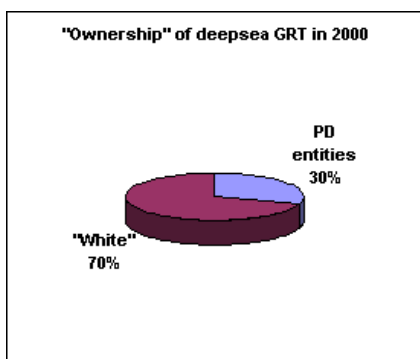
**b. Inshore quota**

The inshore hake and sole quotas have been analysed on the same basis and this shows that 33 and 35% percent of the hake and the sole quota was controlled by PD companies or individuals in 2000. As for the deep-sea quota the proportional share of the quota controlled by PD entities will in reality also be higher given that the majority shareholders of I&J and Seavuna are JSE listed companies.



**5. Vessel ownership**

Given the different types and legalities of holding shares in a vessel or a company makes the issue of vessel ownership extremely difficult. To overcome the problem we worked on the assumption that vessels are either wholly owned by a fishing company, or alternatively that the share held by part owners are proportional to the shareholdings in the company that owns the vessel. The proportional "ownership" of GRT of fishing trawlers was therefore calculated on the basis of percent ownership of vessel owning companies and or share holding of black companies in historical fishing companies that own and operate trawlers. The graphs below show that in 2000 previously disadvantaged entities (companies or individuals) own 30% of the Deep-sea GRT and 32% of the inshore GRT.



**6. Characterisation of the deep-sea and inshore trawling fleets**

In year 2000 there were 61 operational deep-sea trawlers and 29 inshore trawlers. The deep-sea trawler fleet is concentrated in the Western Cape (93%) with 60% of the vessels operating out of Cape Town, 33% out of Saldanha Bay, 5% out of Port Elizabeth and 2% out of Mosselbay. The concentration of the fleet in the Western Cape is also reflected in the landings (95% of the catch was landed in the Western Cape). The inshore fleet operates out of Mosselbay (90%) and Port Elizabeth (10%). To a great extent the concentration of the

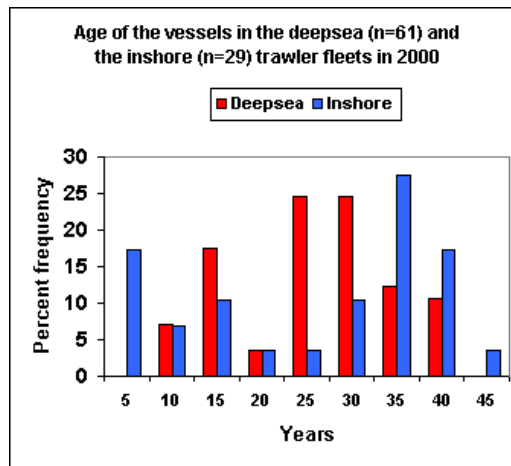
inshore trawling fleet in the Mosselbay area is related to the abundance of sole. Overall the 2000 landings of the trawling industry (deep-sea and inshore) were distributed as follows: Western Cape 95% : Eastern Cape 5%.

The following table provides the most pertinent statistics of the two fleets.

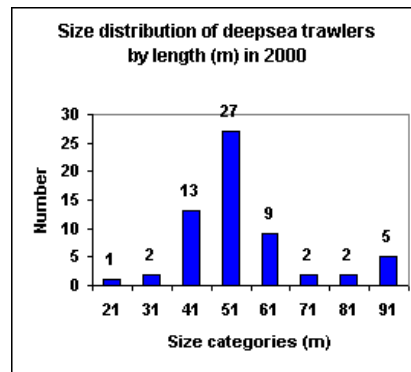
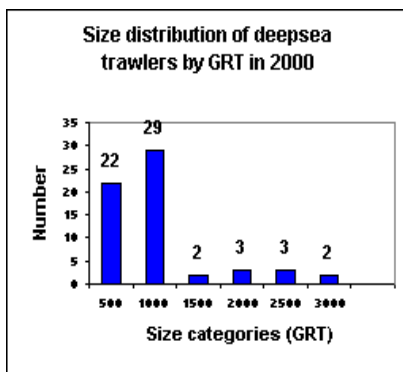
**Characteristics of the deep-sea and inshore trawling fleets operational in 2000.**

Characteristic	Deep-sea	Inshore
Number of vessels operational in 2000	61	29
Freezer (Fr), Combined (Com) and Ice vessels (Ice)	21 Fr, 4 Com, 36 Ice	29 Ice
Average age in years -see graphs	24.5	23.8
Total GRT (tons)	47,978	2390
Average (range) length in m and see graphs	49(20.7 - 90.6)	20.5(14 - 31.2)
Average (range) power in kW (Range)	1464 (582 – 3600)	351 (140 – 920)
Total onboard storage capacity (tons)	29,480	710
Total market value	R754.1 million	R54.7 million
Replacement value	R2380.5 million	R182.7 million
Average (range) number of seadays	191.2(11 – 291)	187 (3 – 290)
Average (range) catch per seaday (nominal tons)	13.3 (4.2 – 25.4)	2.1 (0.9 – 6.9)

The average age of trawlers in the deep-sea fleet in 2000 was 24.5 years, although over 73% the vessels are between 25 and 40 years. 50% of the vessels are between 25 and 30 years old. The average age of vessels in the inshore fleet in 2000 was 24 years, although there are some relatively new trawlers in the fleet. However, the majority of the inshore trawlers are over 30 years old. The graph below illustrates the age of the two trawling fleets.



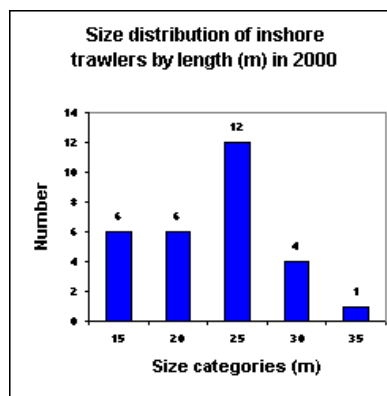
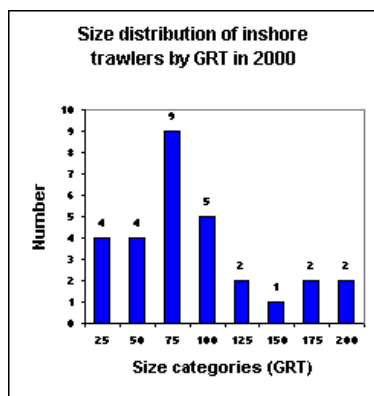
The majority of the 61 vessels in the deep-sea trawling fleet that were operational in 2000 were less than 1000 GRT and ranged between 40 and 50 meters in length. The graphs below show the distribution by GRT and length of the deep-sea trawling fleet.



Stratification of the deep-sea trawling fleet into vessel categories is not possible because of the overlap in size of vessels (by length and GRT) with operational activities. The only two evident categories are those smaller or larger than 1000 GRT and ranging in length between 32 and 61 m. However, some of these are freezers while others are ice boats and these operate on different business strategies / models. Any kind of stratification would therefore be artificial and quite meaningless.

The majority of the trawlers (n = 24) in the inshore fleet (n = 29) are less than 25 m in length and less than 100 GRT (see graphs below). From the catch data it would appear that the "more dedicated" sole trawlers are those < 20 meters, while the large vessels target more on

hake.



**7. The catch and vessel performance**

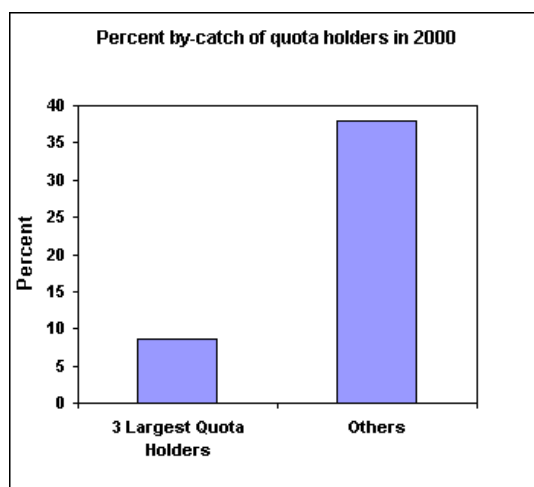
The table below shows the total landings of the major demersal species for the period 1996 to 1999. All figures in metric tons nominal weight.

Species	1996	1997	1998	1999
Hakes	158785	147569	149116	131439
Soles	959	860	890	768
Kingklip	3372	3927	3409	3920
Monk	6161	7639	7902	6949
Horse Mackerel	15307	22922	19264	11641
Other by-Catch	19925	19387	20917	13452
<b>TOTAL</b>	<b>206505</b>	<b>202304</b>	<b>201498</b>	<b>168169</b>

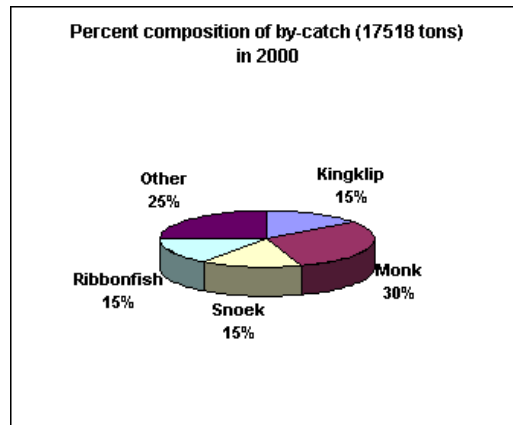
**Note:** As at 18/7/01 landings for 2000 were not yet available from MCM

Overall the demersal trawling industry in terms of capital investment, expenditure and product value is the largest and most valuable sector in the South African fishing industry. The quayside value of the hake catch in 1999, in H&G frozen equivalent, was estimated at R907 million. The market value of the deep-sea and the inshore fleet has been estimated at R754.1 million and R54.7 million and the replacement value at R2380.5 million and R182.7 million, respectively.

The percent by-catch within the trawling industry varies between companies (see graph below). To a large extent this reflects the business models that companies have had to develop and adopt in order to remain viable on the basis of the quantum of hake allocated.

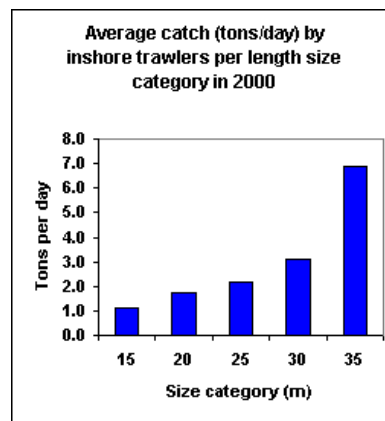
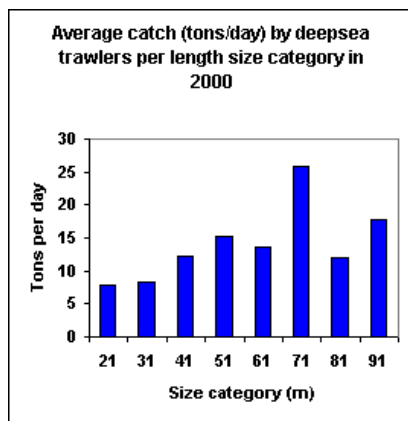


The composition of the by-catch in 2000 is based on 98% coverage of all deep-sea vessels. The four most important species were monk (30%), kingklip (15%), ribbonfish (15%) and snoek (15%). It clearly indicates that monk is targeted by several companies and that it may be an option to consider the imposition of a TAC for monkfish.



The performance of the vessels in the two fleets is shown in the graphs below. The average catch per day of deep-sea trawlers is highly variable. On average, factory freezer vessels are able to handle a higher catch rate than ice vessels. The high variability of catch rates per trawler size and or type is largely thought to be a consequence of the market driven nature of the industry and the different operational business models in the deep-sea trawling industry. This is also reflected by the by-catch proportions (see above).

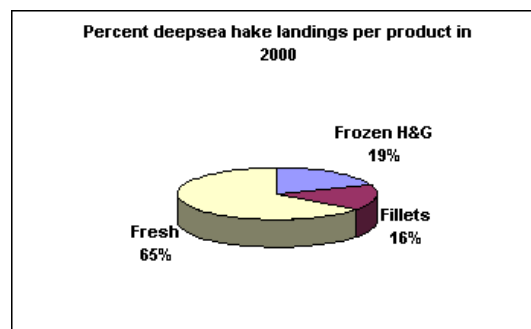
The average daily catch rate of the inshore trawlers is proportional to the size of the vessel and is probably a reflection of fewer business model available to inshore trawler operators.



In recent times deep-sea trawler operators have become more quality conscious. From data returns for 19 of the 61 trawlers operating in 2000 (i.e. 31%) it was possible to calculate that the average trawler operated at 27% below the maximum catch rate. Moreover, the trip duration of ice trawlers have in many instances been reduced by over 50% to ensure fish quality.

### 8. Processing

The deep-sea fleet lands product in three different categories, viz. fresh fish, frozen H&G and market ready, frozen skinned fillets (see below). The greater proportion (65%) or approximately 84188 tons was landed as fresh fish, which undergoes either primary or secondary processing in factories. A small proportion of this fish is sold as PQ. (PQ, abbreviated from Portugese Quality hake, is a term for gutted head on fresh hake). Frozen H&G (headed & gutted) is generally landed in 20 kg blocks and undergoes further processing in factories. Frozen skinned fillets are produced on 5 vessels and most of this product is sold directly into the export market (Europe, USA and Australia).



Analysis of the quanta of fish caught and processed (primary and secondary processing) revealed that a significant amount of transfer

takes place between the "pioneer" companies, small quota holders and new entrants. These findings are summarised in the table below.

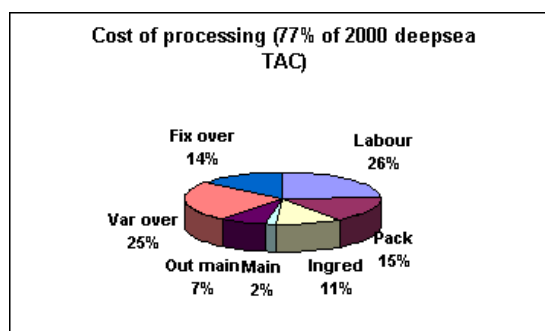
	No. of companies*	Tons	% of TAC	Intra-industry transfers
<b>CATCHING</b>	.	.	.	.
Pioneers	5 (29)	111863	88	- 3440
Hist. Small	6 (13)	8680	7	3540
New Entrants	7	5834	5	- 346
<b>PROCESSING</b>	.	.	.	.
Pioneers	5 (13)	108422	85	-
Hist. Small	4 (15)	13220	10	-
New Entrants	10	5488	5	-

**Notes:**

1. Pioneer companies = 5 + 5 subsidiaries, Historically Small Co's = 13, New entrants = 34
2. \* Numbers in parentheses are quota holders who had their allocations caught or processed entirely or in-part by Pioneer or Historically Small companies.
3. ESS coverage = 89% of quota holders (No returns from 6 quota holders)

Of the 20,032 tons allocated to 32 new entrants since 1993, 5832 tons were caught by 7 (or 21%) new entrant companies. On the other hand, 29% (10 new entrants) were actively engaged in primary processing (PQ export, fish shops, fillets for the local market and other local niche products).

The cost of processing 77% of the deep-sea catch in 2000 (ESS processing cost data coverage) was in the order of R336.8 million. The breakdown of processing costs is shown in the graph below. The factories of the 6 major processors have a replacement value of R 775 million, which in 2000 were used at 72% of maximum capacity.



Given the volume limitations of the South African market the hake industry has established itself as a world leader in processing (in terms of the number and diversity of products) and international marketing of fish products. To a large extent the majority (see Table above) of small quota holders and new entrants are reliant on the pioneer companies for the processing and marketing of product.

The entire inshore trawl hake catch is landed as ice fish. The bulk of the catch is processed in various ways and sold into the domestic market. A small proportion is exported. Approximately 95% of the catch is processed by four of the pioneer companies. The greater proportion of longline and handline caught hake is exported as PQ to southern Europe.

### 9. Employment in the industry.

The deep-sea and the inshore trawling industries are the only fisheries in South Africa that provide formal employment for all sea and land staff (except for unskilled workers in the inshore industry). Staff in all scale groups (except part time staff) receive benefits such as medical assistance, pension and housing allowances in some categories. Moreover, the majority of quota holding companies have social responsibility programmes and in particular the "pioneer" companies. Training and retraining is a significant feature of the industry. Our estimates show that the industry as a whole spends in the region of R7.5 million per annum on training. A high proportion of the workers in the industry are skilled (21% fully skilled and 45% semi skilled). The deep-sea sector is unionised and salaries, which are based on rank and years of experience, are negotiated annually on the basis of employment equity plans. Many of the companies operating in the inshore sector have similar employment models as the deep-sea sector.

The set of tables and graphs on the following pages show the employment figures by race and sex and provide insight into employment / income ratios per scale group.

**TRAWLING INDUSTRY EMPLOYMENT SUMMARY TABLE**

Note: The following summary tables are based only on returns that provided detailed employment figures. The data covers 81% of the total industry payroll and 80% of industry employment figures for 2000

EMPLOYMENT	Total	PDI	Female
Deepsea	7667	7051 (92%)	3034 (40%)
Inshore	1171	1055 (90%)	496 (42%)
Whole industry	8838	8106 (92%)	3530 (40%)

PAYROLL	
Deepsea	R368.3 million
Inshore	R47.2 million
Whole industry	R415.5 million

Note: All staff in deepsea sector are on fixed salaries and benefits and seagoing staff are paid commission on top of salary.

JOB RATIO	Seagoing	Ashore
Deepsea	1	3.10
Inshore	1	2.20
Whole industry	1	3.00

**SUMMARY TABLES OF EMPLOYMENT****TOTAL EMPLOYMENT (NUMBERS)**

	Seagoing	Shorebased	Process	Marketing	Ad&Man	TOTALS
Deepsea	1880	1449	3889	133	316	7667
Inshore	361	182	544	34	50	1171
Industry	2241	1631	4433	167	366	8838

**PDI EMPLOYMENT (NUMBERS)**

	Seagoing	Shorebased	Process	Marketing	Ad&Man	TOTALS
Deepsea	1830	1261	3745	50	190	7076
Inshore	346	147	531	22	26	1072
Industry	2176	1408	4276	72	216	8148

**FEMALE EMPLOYMENT (NUMBERS)**

	Seagoing	Shorebas	Process	Market	Ad&Man	TOTALS
Deepsea	0	62	2903	45	147	3157
Inshore	0	13	436	15	32	496
Industry	0	75	3339	60	179	3653

**TOTAL EMPLOYMENT (PERCENT)**

	Seagoing	Shorebased	Process	Marketing	Ad&Man
Deepsea	25	18	51	2	4
Inshore	31	16	46	3	4
Industry	25	18	51	2	4

**SUMMARY TABLE OF PDI EMPLOYMENT (PERCENT)**

Percent PDI	Seagoing	Shorebased	Process	Marketing	Ad&Man
Deepsea	97	87	96	38	60
Inshore	96	81	98	65	52
Industry	97	86	96	43	59

**SUMMARY TABLE OF FEMALE EMPLOYMENT (PERCENT)**

Percent Female	Seagoing	Shorebased	Process	Marketing	Ad&Man
Deepsea	0	4	75	34	47
Inshore	0	7	80	44	64
Whole Industry	0	5	75	36	49

**SUMMARY TABLES: DISTRIBUTION OF INCOME**

**SUMMARY TABLE**

	% PDI of total staff Mean	% of payroll to PDI Mean	% females total staff Mean	% of payroll to females Mean
DEEPSEA	89 (71-94)	79 (75-91)	29 (4-64)	21 (5-41)
INSHORE	96 (88-100)	92 (82-100)	30 (0-55)	26 (5-40)
WHOLE INDUSTRY	92 (71-100)	86 (75-100)	29 (0-64)	23 (5-41)

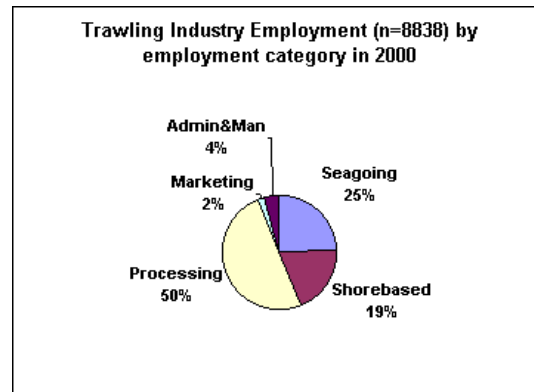
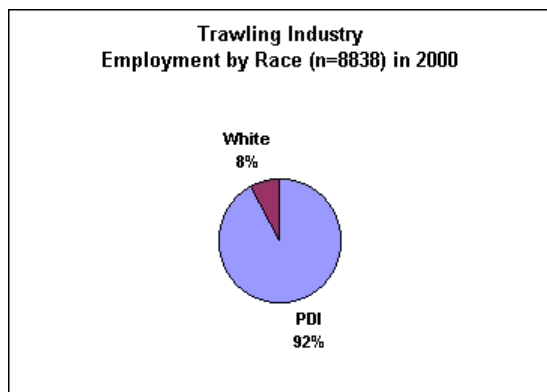
**PERCENT OF PAYROLL TO PDI PER EMPLOYMENT DIVISION**

% of payroll to PDI	Seagoing	Shorebased	Process	Marketing	Ad&Man
Deepsea	90	84	72	23	45
Inshore	96	70	97	18	64
Whole Industry	93	76	82	21	55

**PERCENT OF PAYROLL TO FEMALE STAFF PER EMPLOYMENT DIVISION**

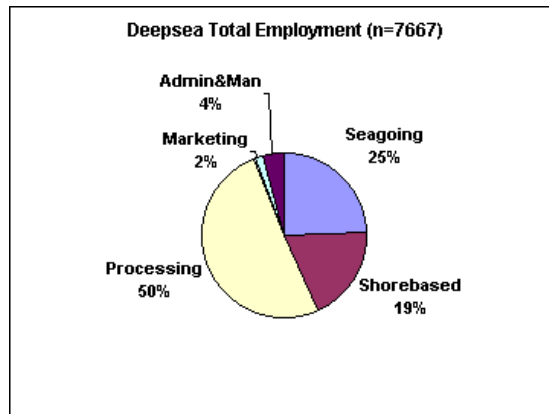
% of payroll to female	Seagoing	Shorebased	Process	Marketing	Ad&Man
Deepsea	0	2	59	16	32
Inshore	0	6	71	35	55
Whole Industry	0	4	65	23	45

a. Employment in the entire trawling industry (deep sea and inshore) by race and by employment category

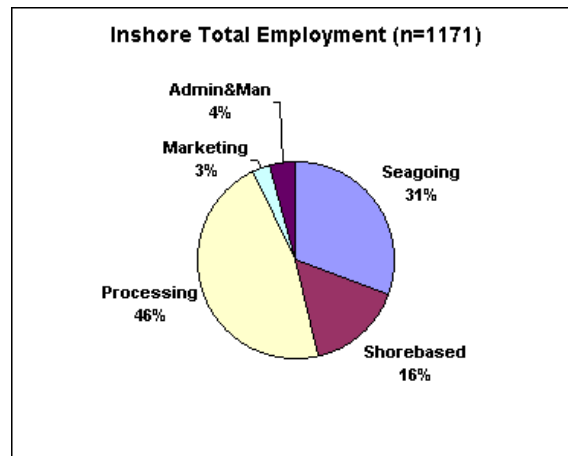


b. Total number of people employed by the deep sea and the inshore trawling industries

i) Deep sea



ii) Inshore

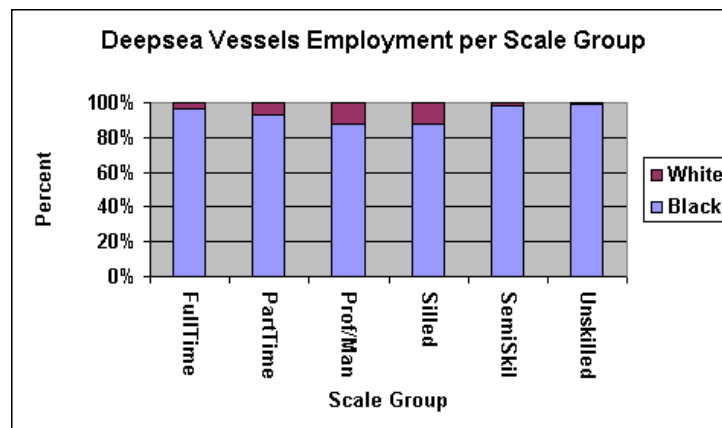


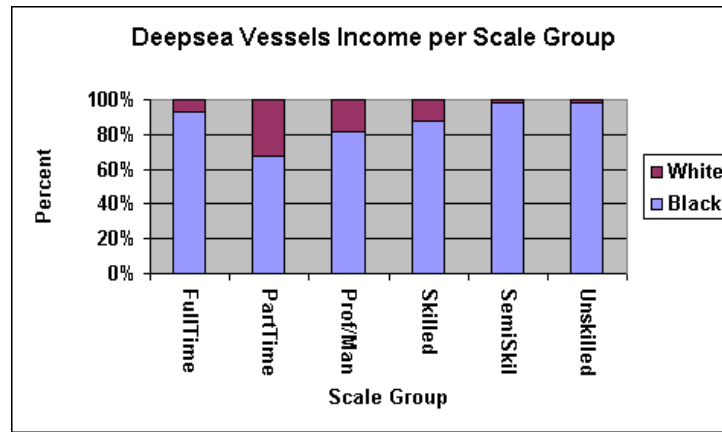
c. Employment per operational division and per scale group

Data is presented for the deep-sea industry in three divisions, viz. vessels, company, and factory and for vessels only for the inshore trawling industry.

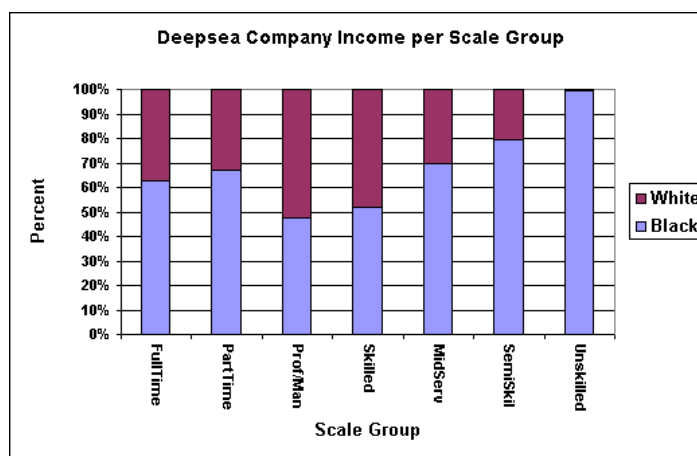
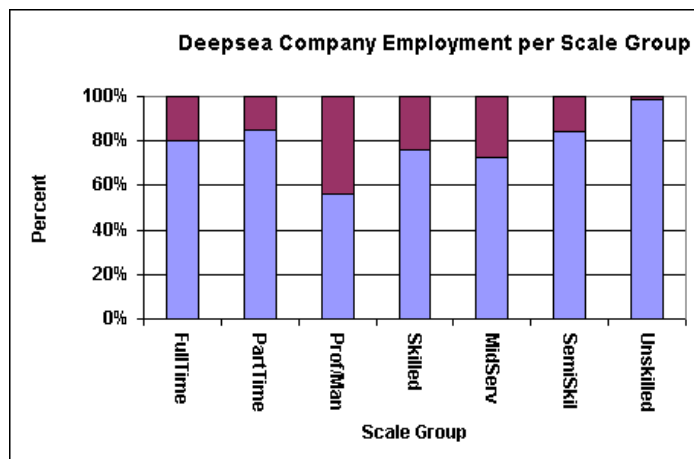
- DEEPSEA (Vessels, Company and Factory)

(i) Vessels

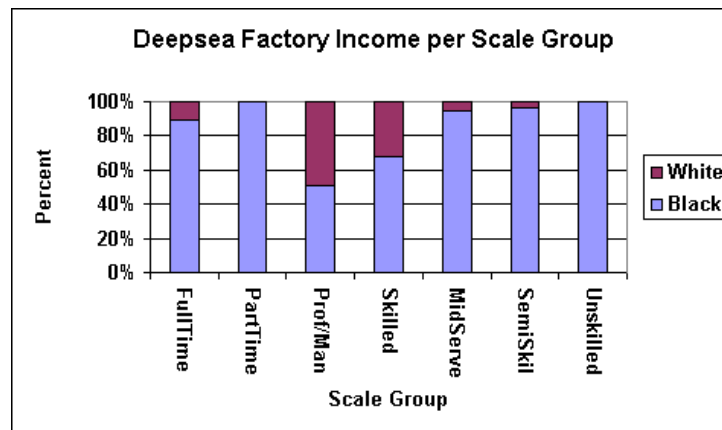
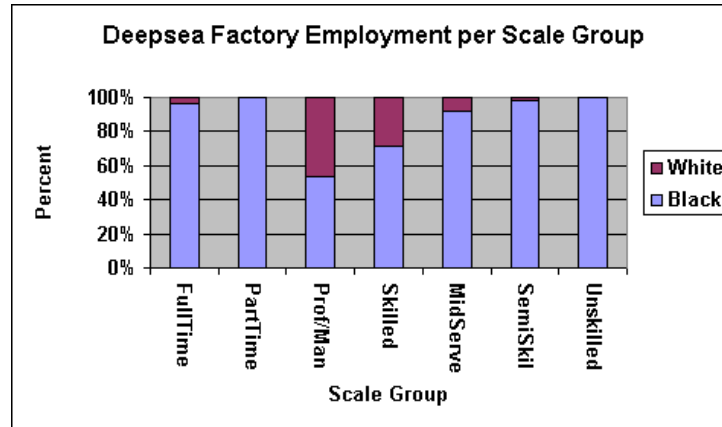




(ii) Company

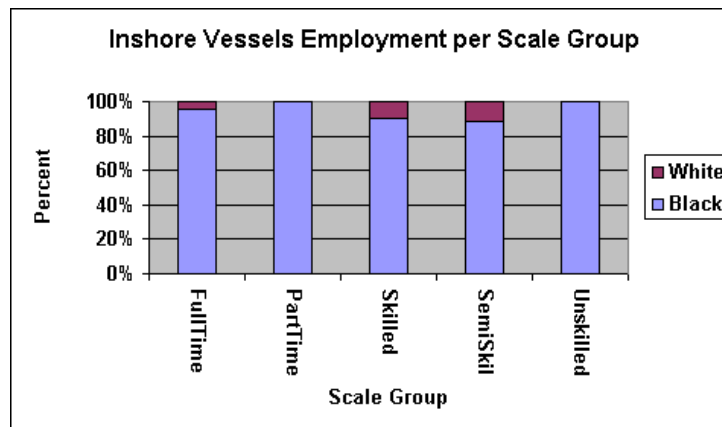


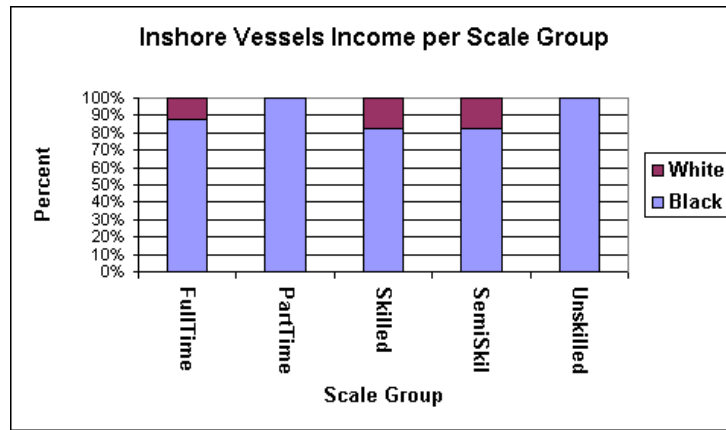
(iii) Factory



- INSHORE

(i) Vessels





## 10. Trawling and Minimum Viable Quotas

It is not at all easy to get to grips with the concept of a Minimum Viable Quota (MVQ). Though the idea seems right at a superficial level it comes as a disappointment that it is lacking in positive and useful properties when examined in more depth. This is largely because the underlying assumptions do not bear rigorous economic scrutiny, which unexamined, may easily pass for assured truth.

Retracing the history of the concept helps to show why the idea is questionable. Two related strands ran through the MVQ debate as the rights allocation policy developed. One arose from the institutional framework within which the fishing industry has operated since the Quota Board and the other came along with the paper quota controversy.

Much of the impetus for MVQ's arose from the fishing rights turmoil between 1991 and 1998. Substantial technical over investment in fishing effort (i) came about as actual (and prospective) rights holders positioned themselves (ii). Under the prevailing conditions the administrative establishment was subjected to intensive lobbying for an "equitable distribution of access rights" on the part of "rent seeking" individuals who usually complained that their quotas did not fit their vessels or their plans.

Paper quota is probably the more important factor to have informed the MVQ debate. Simply put, paper quota is generally perceived to be a "bad thing", largely for emotional and moralistic reasons associated with the idea that fishing rights are in the gift of the State. The "guilty parties" had a response --- that they would be good if only they could, but to do so they needed more quota to validate the scale of investment they envisaged (iii).

The patent undesirability of paper quota's (PQ's) and the turmoil they create meant in effect that it was imperative to eradicate them. It being almost impossible to abolish them by taking the rights of existing holders away entirely, the only alternative would be to enlarge the PQ's already in existence (and ensure that any new allocations measured up to the PQ threshold). If rights holders failed to realise their existing quotas because the amount allocated was too small to support an economically viable operation (as was almost invariably claimed), there must be a greater amount where the "paper rights" could be transformed into something real and viable. This boundary is the MVQ for any given fishery. Enlargement thus becomes a seductive means to wash the "paper" out of the system. Things are never so simple, the real boundary is a constantly moving target.

MVQ's make reallocation unavoidable in mature fisheries, that is fisheries where all the investment that the resource can bear is already subscribed. Augmentation of one right implies at least some dispossession (iv) of the other rights holders if **responsible** fishing is to be maintained. Depending on the "minimum viable business model" actually chosen, the quota structure of the trawl fishery, with its more than 31 or so allocations that are not currently caught by the nominal quota holder, could be such that widespread dispossession will prevail. This will bring many problems in train; problems that can be avoided by taking a more relaxed attitude to Paper Quotas. Deprecating the holders of "paper quotas" serves no good purpose. Do not create them, but should they have been brought into existence then it is best to let them work their way through the system without hindrance or artificial assistance.

The theory behind Minimum Viable Quotas may well be valid for smaller-scale, relatively low tech, homogenous fisheries and or artisanal fisheries. A salient characteristic of these activities is that they provide participants with extremely limited options in any event. (v) However, MVQ's as conceptualised in the ESS turn out to be of very limited value in the more complex, heterogeneous, capital-intensive industries (vi).

As visualised, the MVQ makes no allowance for entrepreneurship, the real complexity of the economic system, technology choices, vertical integration and returns to scale. More advanced industries allow for a larger number of strategic options, commonly called business plans.

One of the findings of the ESS for the deep-sea trawling sector was that there were almost as many different ways of doing business as there are businesses themselves. Another is that classes of disparities in business approach were not necessarily closely correlated with size. It can hardly be reiterated too often that different business strategies entail different MVQ's. For instance an exporter of packaged branded goods (vii) would need a much larger volume of raw fish than would say a catcher who channels product through self-owned neighbourhood fish shops (viii). The kind of market being accessed appears to be one of the chief determinants of operational scale. In other cases the scaling options relate to input cost control (ix).

The general approach to MVQ's is postulated on the idea that there is a justifiable, or threshold ROI in the trawling business and given any particular sunk investment that threshold return fixes the viable minimum volume of fish. In other words the MVQ for any given size of vessel is that quantum of rights that justifies the investment (x). There is no unique viable size. It is for this reason that the ESS methodology compromises by proposing different vessel classes for calculating layered MVQ's. All said and done the idea is based on a justification of existing sunk investment. The reasoning is both circular and sterile. It overlooks the fact that it would, in many cases, reward rent seeking and/or bad investment choices.

Generally speaking, the idea of an allotted MVQ entails certain administrative risks. At a practical level MVQ's would be subject to some unresolved questions:-

Being the minimum an MVQ must be set at the margin of viability. Once quotas are allocated, what happens if the CPUE falls so that the MVQ is no longer viable in terms of the reduced quantum? If quotas are divisible saleable and inheritable what does it imply for MVQ's? How will MVQ's mesh with multiple rights? ie the holding of more than one form of access right by a nominal holder (xi). To what degree does non-marine investment in the fishing industry mesh with the MVQ? Depending on how allocation plans actually play out MVQ's could overload the system and produce the very instability that the Rights Allocation Directorate wishes to avoid.

Purely as a practical approach, is not the answer to the question of "what is an appropriate MVQ in any fishery?" not revealed by the smallest viable vessel operating enterprise (xii) within that fishery? The non-theoretical answer is 306 tons in the case of deep-sea trawling (E F H Walters – MFV Libra) (xiii).

## 11. Vertical integration

Vertical integration arises from scale and organisational economies and may be defined as the degree to which a single firm undertakes the successive stages in the production process of a good. The comments made here are largely qualitative, but non-the-less illustrate the technical advantages and its impact on market structure. Moreover, it must also be born in mind that events that occurred 95 years ago contributed heavily to explaining the modern structure of the trawling industry. The pioneers recognised the importance of distribution from the start and the major companies became closely allied to cold chain food distributors. Once achieved, networked distribution led to a competitive imperative to access more species to complement the product range and companies moved on to setting up infrastructure to buy-in "secondary" species from other fisheries. The dynamics of this linkage promoted integration as buyers needed to secure regular supplies. Of interest in a discussion on vertical integration was the attempt by AngloVaal to outsource I&J's engineering functions to Globe Engineering, another company in its group holdings. This attempt at vertical disintegration failed badly and the policy was abandoned. The same lesson was also learnt by later participants in the trawling business - maintaining an effective in-house engineering facility was vital to sustained success in the deep-sea sector.

The Deep-sea trawling industry is capital and labour intensive measured in terms of the physical catch. This dual intensity comes about by integrating advanced technology and production systems to optimise the beneficiation of what is universally acknowledged to be problematical raw material. The industry deploys fleets in a balanced way to provide a controlled flow of quality sized fish to onshore factories for steady year round output of a wide range of value-added, branded, packaged goods. This system is made possible by relatively large scales of operation, opening the way for integrated control of distant water fishing and onshore processing. Product quality that would otherwise be extremely difficult to attain makes it possible to access international markets at acceptable prices. In short South African trawling entities have evolved into food companies by way of innovative organisation and integration. History shows that the deep-sea trawling industry in fact laid the foundation for the nation-wide frozen food industry. Applied food technology, intensive branding and exploitation of the established distribution infrastructure enabled the industry to introduce a full range of fish products in the form of branded packaged hake goods. Frozen whole fish also became more widely available as the bulk of sales moved away from traditional outlets towards supermarket fish counters and catering establishments. These developments tended to reinforce the importance of branding and distribution and consequently influenced the tendency to integrate. More entrants to the trawling industry also promoted heavier investment in branding. Initial branding of hake product occurred in the thirties but intensive branding in the modern sense started with the development of quick frozen products at the start of the 1960s. Branding provides an effective means to optimise the economic and social benefit derived from the fishery, as customers will pay more for the added value and quality assurance that it entails. Branding also carries important structural implications largely connected to the high overhead costs of brand maintenance. Modern trading practice raises further structural considerations in regard to branding. Namely a need to maintain exceptional quality control, to the point that it involves meticulous organisation of catching and handling operations at a basic level, and a need to attain "critical mass" in order to maintain international trading and contractual credibility. Branding thus promotes vertical integration.

Both of the two vertically integrated companies consist of a trawling division, a processing division and a marketing division. Both are entirely market driven, meaning that processing of a particular line of product is dictated by demand, which in turn dictates the catch rate of the trawling division. Both companies are expanding their market share in the international arena, whilst maintaining market share in the domestic market. The international market has extremely stringent requirements in terms of both volume and quality. Therefore in order to compete effectively requires; (i) Consistency and guarantee of supply and (ii) Consistency and guarantee of quality.

### i. Consistency and guarantee of supply

The operations of the processing factories and the fishing fleets are managed by planning divisions. Based on market demand and requirements the planning divisions regulate the number of vessels at sea, the duration of fishing trips, the landing dates of vessels and the tonnage to be landed the size mix and by-catch requirements. This in turn is linked to the production process in terms of staffing, operational shifts, operational lines, cutting patterns based on market demand, overtime requirements and balancing this with the welfare of the workforce, viz. continuity of work. The underlying concept is that the factories are not producing product for stock, but to meet customer demand. In fact stock levels of both companies are kept at minimum levels to meet the stringent quality requirements. This can only be achieved if the company is vertically integrated and not dependent on catching of fish alone.

### ii. Consistency and guarantee of quality

In the international arena, South African hake competes directly with species such as cod. This in itself is a considerable achievement as hake is generally regarded as an inferior fish. Through the development of high quality products the two vertically integrated companies have managed to elevate considerably the international demand for South African hake and hake products. Because of the vertically integrated nature of the companies they can ensure quality standards through uniform documented quality standards applicable to both the fishing fleets and the factories, the personnel of both units of the company being trained identically and adhering to identical quality standards. Where there is non-compliance of quality standards, either within the fleet or the factory, vertically integrated companies can remedy the situation rapidly as it is not hampered by company boundaries and conflicting needs.

### iii. Conclusion

Vertical integration allows for product development and international competition and market share and is one of the principal reasons for the high seagoing to land based staff ratio (1:3). Other South African companies also export fish but to a large extent these exports are limited to smaller niche markets. From a historical perspective the success of the modern South African deep-sea fishery can be directly attributed to the successful integration of catching, processing, marketing and in particular the distribution of product, first to the South African hinterland and latterly the world. To a large extent the success of the medium and small hake quota holders (old and new) is based on the achievements of the vertically integrated companies, many of which are also entirely or partly dependent on them.

## 12. Levies

In accordance with the TORs of the ESS we examined the options for an equitable levy structure for the deep sea hake trawling industry.

From the outset it was assumed that the levy base would be restricted to the primary sector (up to the quayside). Given that fleet operations are integrated into different business models with varying emphasis on different markets, end products and intervening processes we found no quay level operational standard for the industry as a whole. The solution to the problem was to develop a realistic notional standard and it was agreed that this entailed an opportunity cost approach to the problem. A standard model for a notional H&G freezer trawler was developed; using verified calculated inputs and outputs. This required detailed information on vessel costs and revenues. For the most part the outputs of the model were governed by three important variables:- (a) conventional rate of return employed, (b) the valuation of capital and (c) hypothetical earnings and we developed sensitivity tables to capital employed (depending on the age of the vessel at acquisition) and to catch rate. The findings and options are presented in the section on levy options in the overall ESS report.

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**A disk copy of the operational model will be provided with the final report.**