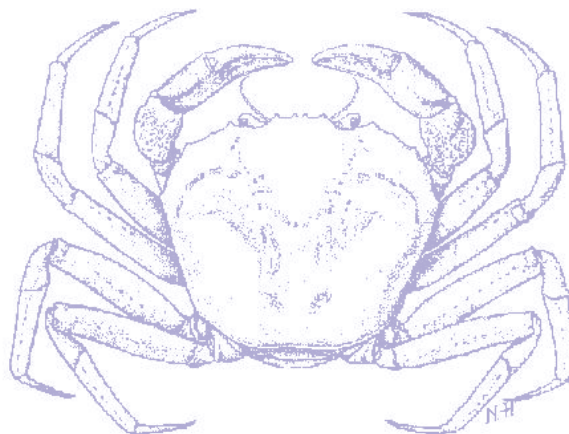




Republic of Namibia

## **MINISTRY OF FISHERIES AND MARINE RESOURCES**



## **ANNUAL REPORT 2007**

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## LIST OF ABBREVIATIONS

<b>ANN</b>	Aquaculture in Northern Namibia
<b>BCLME</b>	Benguela Current Large Marine Ecosystem Programme
<b>BENEFIT</b>	Benguela Environment Fisheries Interaction and Training Programme
<b>CCAMLR</b>	Commission for the Conservation of Antarctic Marine Living Resources
<b>CFC</b>	Common Fund Commodities
<b>CSIR</b>	Council for Scientific and Industrial Research (South Africa)
<b>DSP</b>	Diarrhetic Shellfish Poisoning
<b>EEZ</b>	Exclusive Economic Zone
<b>EU</b>	European Union
<b>FAO</b>	Food and Agricultural Organisation
<b>FOA</b>	Fisheries Observer Agency
<b>GDP</b>	Gross Domestic Product
<b>GEF</b>	Global Environmental Fund
<b>HAB</b>	Harmful Algal Bloom
<b>ICCAT</b>	International Commission for the Conservation of Atlantic Tunas
<b>ICT</b>	Information and Communication Technology
<b>INFOPECHE</b>	Intergovernmental Organisation for Fishery Information and Co-operation Services for Fishery Products in Africa
<b>KIFI</b>	Kamutjonga Inland Fisheries Institute
<b>Km</b>	Kilometre
<b>MCS</b>	Monitoring, Control and Surveillance
<b>MFMR</b>	Ministry of Fisheries and Marine Resources
<b>N\$</b>	Namibian dollar
<b>n. mile</b>	Nautical mile
<b>NAMFI</b>	Namibian Maritime and Fisheries Institute
<b>NATMIRC</b>	NATMIRC NORAD National Marine Information and Research Centre
<b>NORAD</b>	Norwegian Agency for Development Cooperation
<b>NLO`s</b>	National Liaison Officer's
<b>NPC</b>	National Planning Commission
<b>PV</b>	Patrol Vessel
<b>QMA</b>	Quota Management Area
<b>RV</b>	Research Vessel
<b>SADC</b>	Southern African Development Community
<b>SEAFO</b>	South East Atlantic Fisheries Organisation
<b>TAC</b>	Total Allowable Catch
<b>UNDP</b>	United Nation Development Programme
<b>US – FDA</b>	United States Food & Drug Administration
<b>VMS</b>	Vessel Monitoring System

## FOREWORD

It is, once again, an honour bestowed upon me to present the 2007 Annual Report for the Ministry of Fisheries and Marine Resources.

As it can be evidenced from the content of the Annual Report, the Ministry has been hard at work dedicating all the resources made available to it for the continuous sustainable harvesting of Namibia's fishery resources, both at sea and in our inland water bodies. To this end, I am proud to report that, as we had undertaken to, tremendous work was done to harness the development of aquaculture/mariculture and to continue conservation measures of our various marine resources at sea.

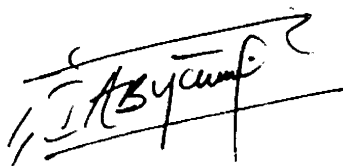
The Ministry of Fisheries and Marine Resources would also acknowledge the support given by various countries and organizations in order to augment our dedicated development efforts throughout the years of our existence as a Ministry. Equally, the involvement of our key stakeholders, such as O/M/As, non-governmental agencies and the Namibian population in general, has added a special impetus to our success and, as such, we will remain dependent on such valuable support in our future endeavours.

We are very much proud to recognize the remarkable progress that has been achieved by our Government in the field of fish production, supported by sound policy and legislation. Definitely, Namibia is one of the countries that feature, highly, in the international arena when it comes to sound and efficient management of our natural resources, including those resources in our sea and several inland water systems.

While recognizing the achievements made in this Sector, we should not be oblivious of the many challenges that have been on our journey to success. To mention just a few of those challenges; we have experienced turbulent environmental conditions (mostly brought about by adverse climatic conditions), the unfavourable exchange rate (N\$/US\$), rise in the price of fuel, unpredictable market prices as well as the stiff competition brought about by prices of fish from other countries (including substitute products), the Economic Partnership Agreement (EPA) demands and other similar factors.

It is however our resolve to, together with the fishing industry; continue to diversify our efforts through value addition, market diversification and vigorous marketing of our products.

I therefore wish you an enjoyable reading of this informative Annual Report (2007).



**DR. ABRAHAM IYAMBO**  
**MINISTER**

# 1. THE MINISTRY OF FISHERIES AND MARINE RESOURCES

The Ministry of Fisheries and Marine Resources is responsible for the management and development of fisheries and aquaculture.

## 1.1 Objectives

The overall objectives of the Ministry are derived from the Mission Statement. Our objectives are to:

- Promote and regulate the responsible and sustainable utilisation of living marine and freshwater resources and aquaculture within the context of environmental sustainability.
- create a conducive environment in which the fishing and fish processing industries can prosper and derive optimal income from marine resources.
- Further Namibia's interests within the international fishing sector.
- Provide professional, responsive and customer-focused services.
- Deliver services efficiently and effectively by providing best value for money.
- Continuously invest in human resource development so as to enhance Namibia's capacity to manage fisheries and marine resources. Develop and ensure participation of Namibians in domestic fishing and fish processing, and for them to play an effective role in regional and international fisheries affairs.

## 1.2 Organisational Structure

The Office of the Permanent Secretary provides executive management to four directorates within the Ministry namely:

- The Directorate of Resources Management, responsible for scientific research and advice,
- The Directorate of Operations, responsible for monitoring, control and surveillance,
- The Directorate of Policy, Planning and Economics, responsible for MFMR planning activities, formulating fisheries policies and legislation as well as to undertake research to advise on the socio-economic issues, and
- The Directorate of Aquaculture, responsible for the administration and promotion of aquaculture development.
- A General Services Division provides administration and support services.

### 1.2.1 Directorate of Operations

Main responsibilities:

- Regulation of fishing activities within the Namibian EEZ.
- Monitoring, control and surveillance through the operation of fisheries patrol vessels, cars for coastal inspection and fisheries patrol aircraft.
- Deployment of Inspectors at processing plants, harbour and midwater.
- Fisheries legislation enforcement.

### *1.2.2 Directorate of Resource Management*

Main responsibilities:

- Provides advice on the state of commercially important marine fish stocks and recommendations on their appropriate yields;
- Advises on appropriate management measures in relation to species and fish size limitations, closed seasons, closed areas and limitations on the types and effectiveness of fishing gear.

### *1.2.3 Directorate of Policy, Planning and Economics*

Main responsibilities:

- Co-ordinates the formulation, implementation as well as monitoring and evaluation of fisheries policies and legislation.
- Carries out continuous policy and economic research and analyses.
- Responsible for the management of information services of the Ministry
- Administration of fishing rights and quotas
- Collection of fees
- Analysis and publication of fisheries statistics.
- Co-ordinates overall planning within the Ministry.

### *1.2.4 Directorate of Aquaculture*

Main responsibilities:

- Ensure the responsible and sustainable development of aquaculture, to achieve socio-economic benefits and environmental sustainability.
- Facilitate an efficient, coordinated administrative and institutional framework for aquaculture.
- Ensure that the genetic diversity and integrity of the aquatic ecosystem is maintained.
- Promote responsible aquaculture production practices.
- Research on fresh water fish resources in the interior of Namibia and provides advice on the conservation and management of those resources.

## **1.3 MINISTRY'S CUSTOMER CHARTER AND STRATEGIC PLAN FOR 2009-2014**

The Ministry upholds the standard of Customer Charter, in accordance with the Public Service Charter of Namibia. The Customer Charter was also reviewed to accommodate aquaculture services. In the same vein, the MFMR Strategic Plan was realigned according to the Office of the Prime Minister (OPM) framework. The Strategic Plan and Customer Charter can be accessed via the Ministry's website.



## 1.4 FINANCE

The operations of the Ministry are financed through the Operational Budget and the Development Budget respectively. The operational budget for 2007/2008 was N\$128 967 million the breakdown is indicated in *Table 1*.

**Table 1: Operational Budget for 2007/2008 (million)**

Programmes	N\$'000
Office of the Minister	2,350
Administration	16,647
Resource Management	21,246
Operations	61,049
Aquaculture	17,416
Policy, Planning & Economics	10,416
<b>Total</b>	<b>128,967</b>

Source: MFMR, 2007

The development budget for 2007/2008 was N\$ 34,738 million. Fourteen capital projects were funded under this budget, as shown in Table 2 below.

**Table 2 : Development Budget for 2007/08**

Project	( N\$'000)
Kamutjonga Inland Fisheries Institute	9,000
Traditional Fishing Development/Renovation and Extension of Building	300
Aquaculture Development Project at Olushandja Dan/Onavivi	4,100
Aquaculture Development in Kavango	6,269
Aquaculture Development in Caprivi	6,269
Renovation of MFMR Head Office Windhoek	0
Renovation of Hostels, Premises, Offices and Classrooms	0
Upgrading of Ongwediva Hatchery and Construction of New Offices	4,300
Upgrading of Hardarp Facilities/Ponds	0
Construction of New Research Vessel	1,500
Extension and Renovation of Swakopmund (NATMIRC)	0
Construction of MFMR Regional Office in Caprivi	1,500
Construction of MFMR Regional Office in Kavango	1,500
Leonardville Fish Farming Project	0
<b>Total</b>	<b>34,738</b>

Source: MFMR, 2007

In addition to the budget provided by Government, the Ministry received technical and financial assistance from countries and organisations during the year. The main areas of donor support are indicated in Table 3 below.

**Table 3: Donor assistance received during 2007**

Donor	Type of assistance provided
Spanish Regional Government of the Xunta de Galicia	Financial assistance on aquaculture development projects (Omahenene/Onavivi); technical assistance to NAMFI; staff training in Spain. Cooperation between Namibian and Spanish scientists to carry out surveys.
Government of Malawi	Technical assistance (aquaculture development projects).
Government of Cuba	Technical assistance (aquaculture development projects).

Source: MFMR, 2007

## 2. FISHERIES RESEARCH

### 2.1 MARINE CAPTURE FISHERIES RESEARCH

#### 2.1.1 Research Vessels

The Directorate is operating two research vessels, namely: R/V Welwitchia and R/V !Anichab. The vessels are based in Walvis Bay and Luderitz, respectively. The main objective is to conduct research surveys. The following table summarizes the activity of the two vessels. The R/V Welwitchia spent a total of 142 days at sea conducting resource and environmental surveys, while the R/V !Anichab spent 150 days conducting mainly environmental surveys

**Table 4 : Surveys conducted by Research vessels during 2007**

<b>Name of Research Vessel</b>	<b>Number of days at sea</b>
R/V! Anichab	150
R/V Welwitchia	145
<b>Total</b>	<b>295</b>

Source: MFMR, 2007

**Table 5 : Surveys**

<b>Survey Type</b>	<b>Surveys 2007</b>
Hake	1
Horse Mackerel	1
Pilchard	2
Monk	1
Orange Roughy	1
Environment	5
Crab	1
Rock Lobster	2

Source: MFMR, 2007

### 2.2 STATE OF THE MARINE ENVIRONMENT

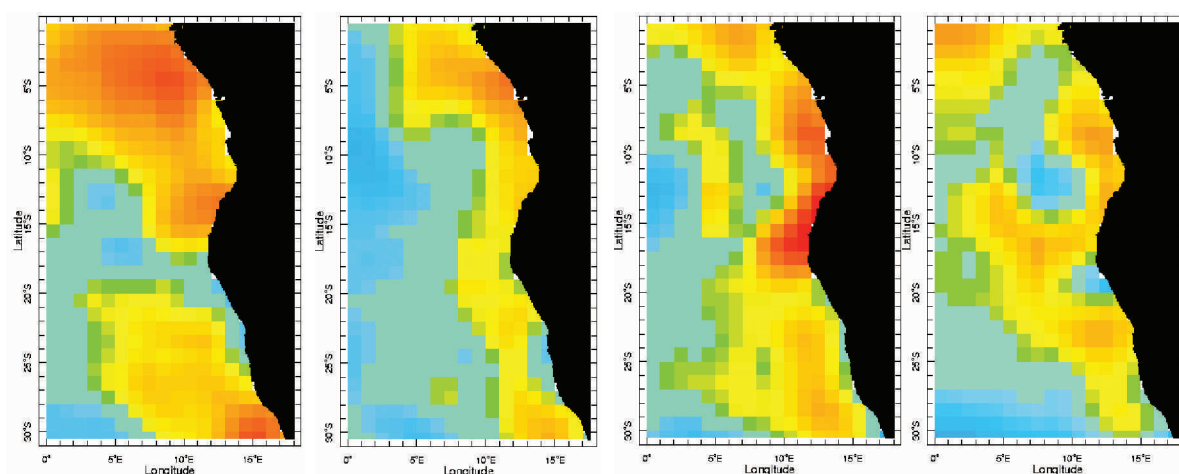
The Ministry has conducted five environmental-monitoring surveys in 2007. The purpose of the survey was to gather information on important oceanographic parameters and processes, such as; sea temperature, salinity, dissolved oxygen, hydrogen sulphide, nutrients, chlorophyll-a, phyto- and zooplankton, upwelling and frontal movements. Other opportunities to collect environmental information, such as, the resources surveys (e.g. pilchard, hake, horse mackerel surveys) were also utilised. In addition, remotely sensed data of wind speed and direction, air temperature, sea surface temperature and chlorophyll-a were obtained from various other sources e.g. satellites and weather stations.

Environmental conditions, during the 2007 season, seem to follow the same trend as during the past few years. Upwelling favourable winds measured at the main upwelling centre of Lüfderitz is still below average. This is also reflected by the above average sea surface temperatures we are experiencing since the early 1990's.

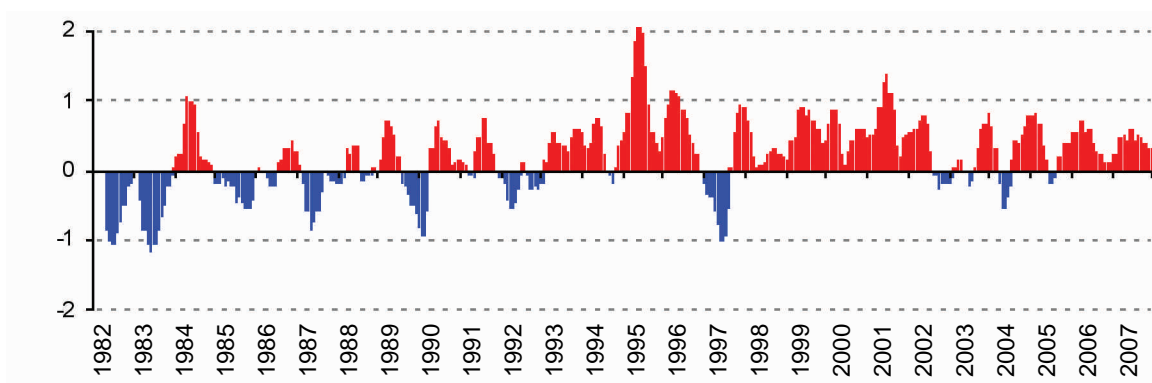
Primary production (phytoplankton production) has been above average during the first half of 2007; however, it was below average during much of the 2006 season. Secondary production in the form of zooplankton,

has dropped since 2004, but remains much higher than historical levels. Oxygen conditions over the Namibian shelf have been favourable during the past few years - the last major low oxygen event occurred during the 2000/20001 seasons.

Sea surface temperature: Figure 1 represents the monthly sea surface temperature anomalies over the Namibian and southern Angolan shelf areas between September and December 2007. Figure 2 represents the average monthly sea surface temperature anomalies for the central & northern Namibian shelf (17-23°b0S) since January 1982. The general trend show that temperatures were generally above the long term average since 1993

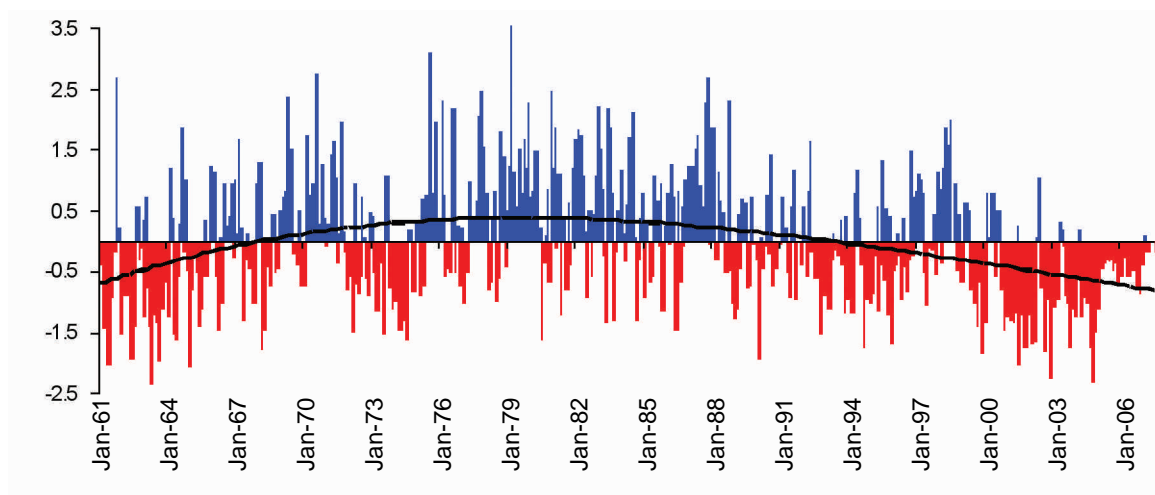


**Figure1 : Monthly SST anomalies off central Namibia between September and December 2007**



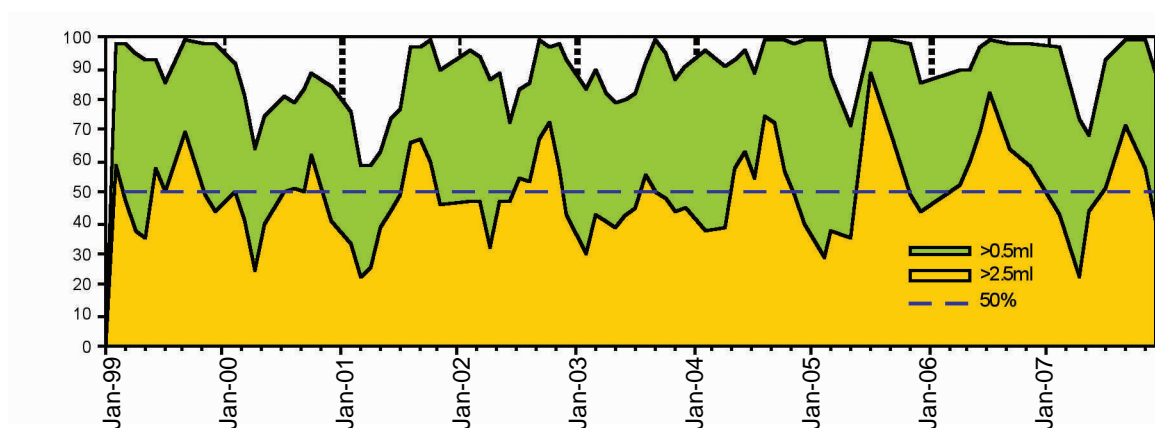
**Figure 2: monthly SST anomalies for the central to northern Namibian shelf region (17-23S) since January 1982**

**Wind:** Figure 3 illustrates the monthly upwelling intensity off Lüderitz - it is clear from the graph that upwelling has been consistently below average since the 1999/2000 seasons and that the downward trend since 1992/93 fits well with the increased temperature trend shown in Figure 2.



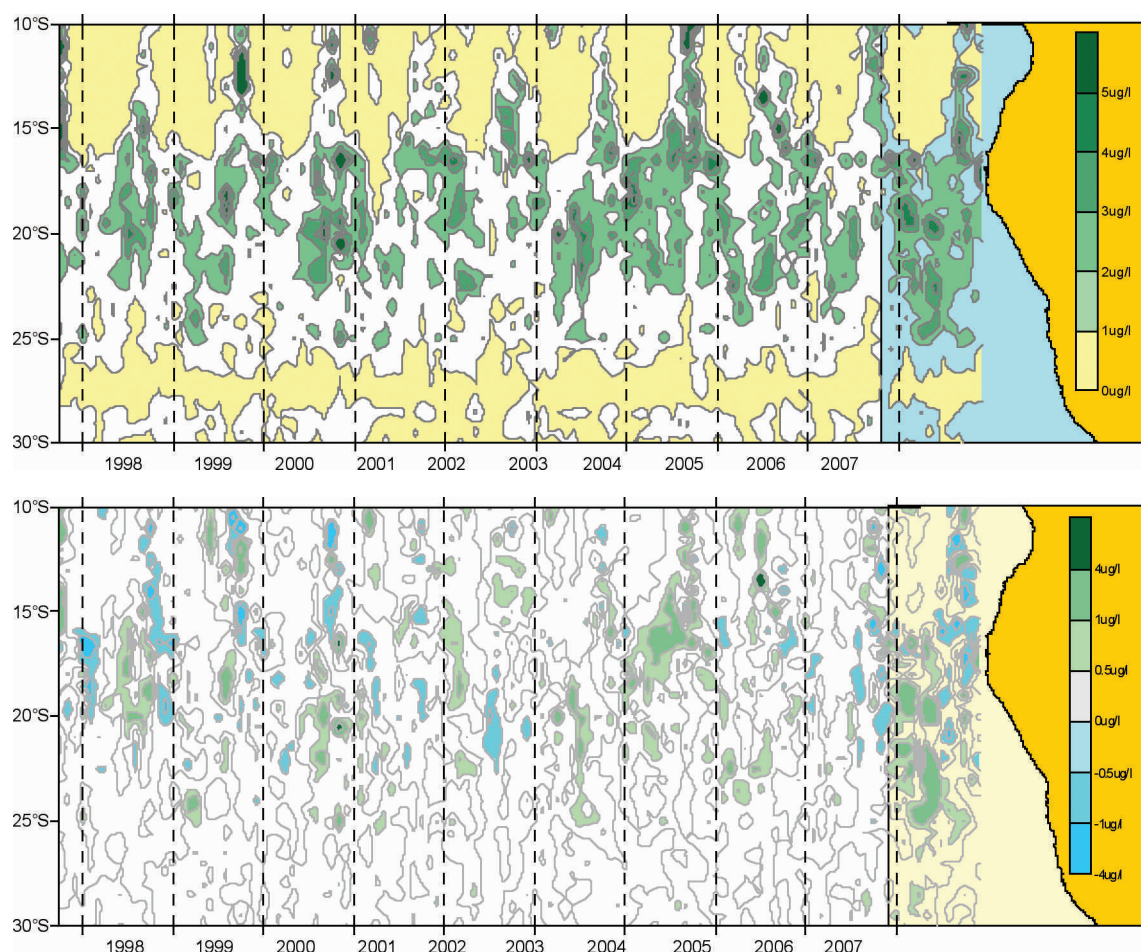
**Figure 3: Monthly alongshore wind anomalies recorded at Diaz Point, Lüderitz – blue indicates stronger than average southerly winds and red indicates below average winds. These southerly winds are directly responsible for upwelling along this part of the coast.**

**Oxygen:** Dissolved oxygen is one of the key environmental variables influencing the habitat suitability in biologically productive systems such as the northern Benguela. Oxygen conditions over the Namibian shelf have been favourable during both the 2006 and 2007 seasons as shown in the Figure 4.



**Figure 4 : Percentage habitable area of water with dissolved oxygen content 2.5ml/l (yellow) and 0.5ml/l (green) on the central Namibian shelf (up to 50nm). The value 2.5ml/l is the lowest threshold for successful survival of pilchard eggs and larvae. The dashed line indicates the level of the historical mean for the 2.5ml/l oxygen level.**

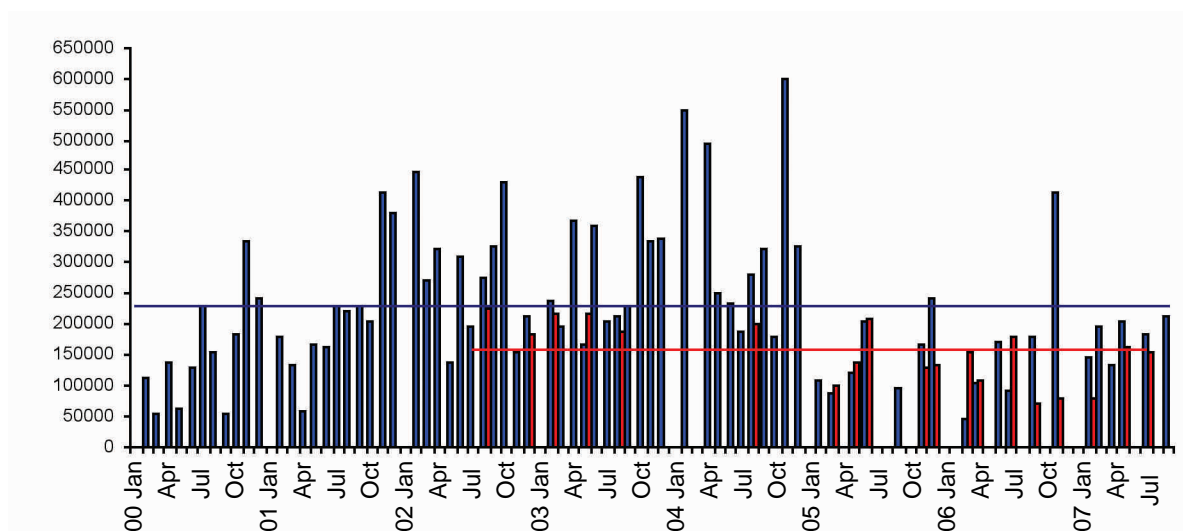
**Phytoplankton:** Figure 5: shows a monthly chlorophyll-a and chlorophyll-a anomaly index, representing these parameters in a 60km band along the southern Angolan and Namibian coastlines. The highest chlorophyll-concentrations are usually found off central Namibia, which is located downstream of the strong Lüderitz upwelling cell. The central and northern Namibian shelf areas experienced high chlorophyll-a levels (above average) during the first half of 2007, but decreased towards the end of 2007 at levels below average.



**Figure 5 : Time series of chlorophyll-a concentration (top panel) and the anomaly thereof (lower panel) along the southern Angolan and Namibian coastlines since September 1997.**

## Zooplankton

Copepod abundance provides an excellent proxy of secondary production (Figure 6). Since February 2005, total copepod abundance has been below the average for the time series, except for the month of November during which copepod abundance peaks. This peak in abundance has been shown in previous studies and is likely to be linked to the onset in upwelling a few weeks earlier. Historical records of zooplankton abundance show that current levels are still much higher in comparison. One of the reasons often mentioned is that historically zooplankton numbers were kept low by the large pelagic fish stocks, which is currently absent.

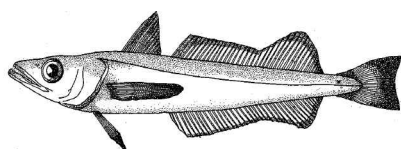


**Figure 6: Copepod abundance (no. of individuals per square meter surface water) on the 23°b0S (blue bars) and 20°b0S (red bars) transect since 2000.**

## 2.3 STATE OF THE MARINE RESOURCES

### 2.3.1 Hake

The Jan/Feb 2007 swept-area biomass survey showed the total relative abundance



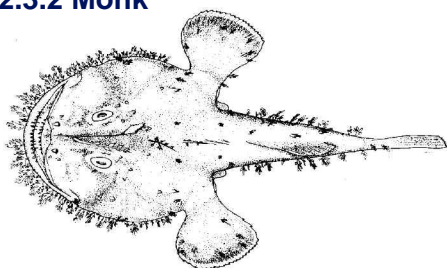
estimates to be 701 000 tonnes, when compared to the previous year. However, about 83% of this biomass was made up of small fish of less than 36 cm in length (classified as non-fishable stock). Also, the age structured production model (ASPM) estimated the MSY of the stock

to be between 250 and 350 thousand tonnes.

The year 2007 also saw the re-enforcement of additional conservation measures, which were introduced at the beginning of the 2006/2007 fishing season for the hake sector. These measures included a first ever closed season during the month of October (to protect the breeding stock and allow spawning to take place without disturbance), as well as the closed area of 200 m depth extended to 300 m south of 25°b0S and an Exclusive area for wetfish trawlers between 300 m and 350 m south of 25°b0S. At this point in time, it is recommended that the measures continue to be in place until such time that enough data is gathered to fully assess its effectiveness. However, in late 2007 there were reports of improved catch rates and the recently concluded biomass survey (Jan/Feb 2008) showed an increase in the biomass of large fish (>35 cm length).



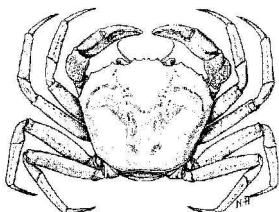
### 2.3.2 Monk



The recent biomass survey estimates (November 2007) show that the monkfish stock is estimated at about 15 000 tonnes. As length at 50% maturity is estimated to be around 30 cm, about 68% of the estimated biomass in 2007 was immature fish. This is

due to a significant increase of this component of the stock, which translates into good recruitment. In addition, the CPUE has increased while the catch at length data also indicates a healthy stock.

### 2.3.3 Deep-sea red crab



Assessment of the Namibian deep-sea red crab stock, for 2007, was based mainly on data from 2006, since the 2007 season is still ongoing. The annual CPUE was observed to have declined by 14% since the previous year. Although average size of male crab from commercial catches increased since the mid eighties, it has been fluctuating around a stable average since 2000, whilst for female crab it was more variable. The 2007 survey data showed a virtual

absence of juvenile crab (compared to the previous three surveys when juvenile crab were relatively abundant in the 19° - 19°45' S area, at depths 500-700 m). Biomass estimated by the De Lury model indicates that the increasing trend in biomass observed since the mid 1990's has stabilised during the past three years (2004-2006) and both the model and the survey estimates indicate biomass to be around 15000-16000 tonnes at present.

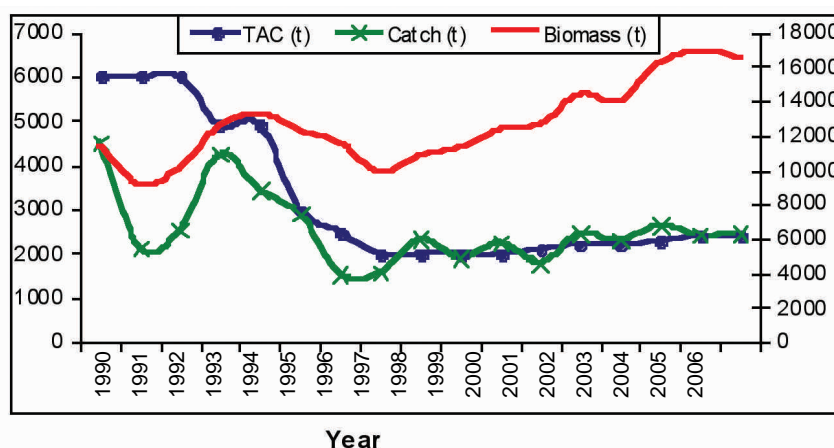


Figure 7 :Total allowable catch (TAC), total catch landed and estimated biomass since 1990.

### 2.3.4 Rock lobster



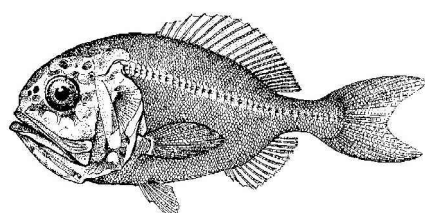
During the 2006/2007 commercial fishing season, the lobster industry managed to fill only 48% of the total allowable catch set for the season. During the previous year, 70% of the TAC was. In addition, the catch-per-unit effort (CPUE) was estimated at 1.06 kg/trap fishing days during the 2006/2007 season. In 2006/2007 season, CPUE was estimated at 1.86 kg/trap fishing days. The De Lury model predicted the fishable biomass for the 2006/2007 season at around 936 tonnes.

The highest monthly catches for the 2006/2007 season were landed during November 2006, March 2007 and December 2006, respectively, which were the months during which a major part of the fleet was fishing in the southern fishing grounds.

**Figure 8 : Total Allowable Catch, Total Catch Landed and Estimated Fishable Biomass (tonnes) per annum since 1992.**

However, with the abnormal weather conditions that occurred during the first quarter of 2007, it is not surprising that catches were so poor. Moderately aerated bottom waters precluded the normal inshore movement of lobsters from deeper waters in the northern and central fishing grounds during January. In turn, the intermittent abating of SW winds from early February to April resulted in calm water conditions, which lead to warmer sea temperatures and consequent plankton blooms. Subsequent collapses of these blooms may have brought on the poor oxygen conditions recorded during February, March and April, which may have negatively impacted on catches – since lobsters tend not to feed during such low oxygen events.

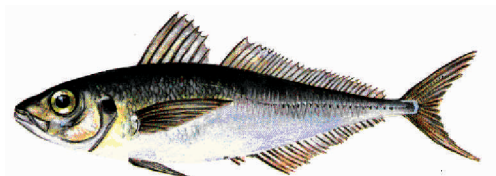
### 2.3.5 Orange Roughy



During the 2007 orange roughy fishing season, fishing only took place from May to August 2007. During this period two vessels were fishing for orange roughy. The total catch for these four months was approximately 290 tonnes of orange roughy. Results from the July 2007 biomass survey showed that there was no major increase in the biomass of orange roughy, compared to the previous year. Current conservation measures include the closure of the Quota Management Area (QMA) Rix and the exclusion of other fishing vessels from the QMA's.



### 2.3.6 Horse Mackerel



The 2007 acoustic survey biomass estimate remained unchanged from the estimate obtained during the 2006 acoustic biomass survey. Similarly, the midwater catch-per-unit effort (CPUE) was the same as it was in 2006. However, CPUE is more an index of the shoaling behaviour of the fish than an index of abundance. The horse mackerel distribution mapped during the biomass survey, in March 2007, showed a patchy distribution with no fish south of Walvis Bay, except for a few shoals close to the 23°baS latitude in the offshore stratum. The distribution of the stock may have extended into Angola as some shoals were encountered on transects right at the border, although the survey did not extend into Angola.

Even though the ratio of juveniles to adults favoured adults, as is always the case, there was about 10% more juvenile fish in 2007 than in 2006, which indicates a narrowing of the ratio of adult to juveniles, probably an indication of some success in the recruitment. The strong cohort of 1-year olds (15 – 18 cm) observed in 2006 was not found during 2007. This could be a result of this cohort being exploited by both the Pelagic and the Midwater fisheries. The two fisheries show a major overlap of catch-at-length between 15 and 19 cm total length.

### 2.3.7 Large Pelagic:



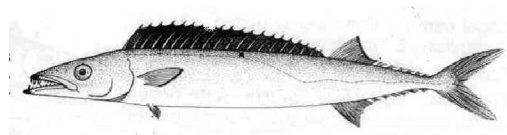
The three most important tuna and tuna like species that are caught in Namibian waters are albacore tuna, bigeye tuna and swordfish with yellowfin tuna to a less extent. The industry has expanded in recent years when rights to catch pelagic sharks were issued by the Ministry,

hence most of Large Pelagic right holders started targeting blue and shortfin mako sharks. The tuna most commonly caught is albacore with a catch of 1195 tons (RWT) for 2007 compared to 2484 tons in 2006 indicating a decrease in catches with the majority of landings recorded in the first four months of the year. For bigeye tuna 151 tons were caught, which is roughly the same as for 2006 (157 tons). Swordfish catches have increased significantly (84%) from 877 tons in 2006 to 1037 tons in 2007. This is the highest landings recorded since the fishery commenced.

In 2007 the shark fishery for blues has declined significantly (55%) with 3700 tons harvested compared to 6642 tons recorded in 2006. Short-fin mako catches were roughly the same with 1001 tons in 2007 compared to 1130 tons for 2006. Very few hammerhead and thresher sharks were caught in 2007.

## **2.3.8 Line boat sector**

### **2.3.8.1 Snoek**



No annual TAC is given out for lineboats to catch snoek, kob or West Coast steenbras and they harvested what was available to them annually. However, kob and West Coast steenbras catches

(by this fishery) were almost zero over the last 5 years and therefore they targeted snoek. With the conversion of the traditional wooden lineboats, using ice for preserving the catch, to freezer lineboats (2001) they can now produce high-value fresh/frozen snoek instead of low-value vlekke & salted snoek as in the past. Snoek is also caught relatively close to Walvis Bay and the new fresh/frozen products make it a much more profitable species to target. For 2007, a total of 1575 tons of snoek was landed.

### **2.3.8.2 Silver Kob**



Historically, silver kob was the most important component of the linefish fishery of Namibia and was caught by recreational shore anglers and skiboats, and commercially by lineboats and some skiboats. However, for the last 5 years the amount of kob caught declined sharply to only 1.6 tons in 2007.

In 2006, recreational anglers caught approximately 49 221 silver kob (average mass 2.5kg) which relates to approximately 123 tons. Total anglers catches for 2007 was approximately 69 406 kob which relates to about 173 tons which is a 40% increase. It is of importance to note that in 2005, 2006 and 2007 significant “kob runs” occurred in the Sandwich and Meob Bay spawning grounds, which indicates good recruitment. These annual events did not happen between 2002 and 2004. Current management regulations are 1) a daily bag limit of 10 fish per angler, 2) a minimum size limit of 40cm, and 3) the daily bag limit should allow an angler to retain only two silver kob larger than 70cm.

#### 2.3.8.3 West Coast Steenbras:

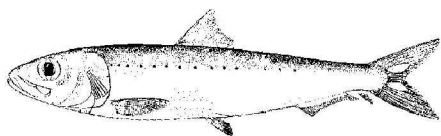


Two distinct West Coast steenbras populations occur in Namibian waters namely a closed and separate population at Meob Bay situated in a closed area and is therefore unavailable to recreational anglers. Lineboats target this population only when silver kob (*Argyrosomus inodorus*) becomes scarce and this last happened in 1997. Recreational anglers exploit only the northern population, occurring in the open angling area.

During 2006, 16 580 individuals were caught by recreational anglers which relates to about 48 tons (average mass of 2.9kg). In 2007, recreational anglers caught a total of 22 055 West Coast steenbras which relates to approximately 86 tons relating to a 55% increase in tons. These figures are not exact as the next formal stock assessment for West Coast steenbras will be in October 2008 (every 3 years).

In order to protect the smaller-sized males as well as the larger-sized females, management regulations are 1) a daily bag limit of 10 fish per angler, 2) a minimum size limit of 40cm, and 3) the daily bag limit allows an angler to retain only two West Coast steenbras larger than 65cm.

#### 2.3.9 Pilchard

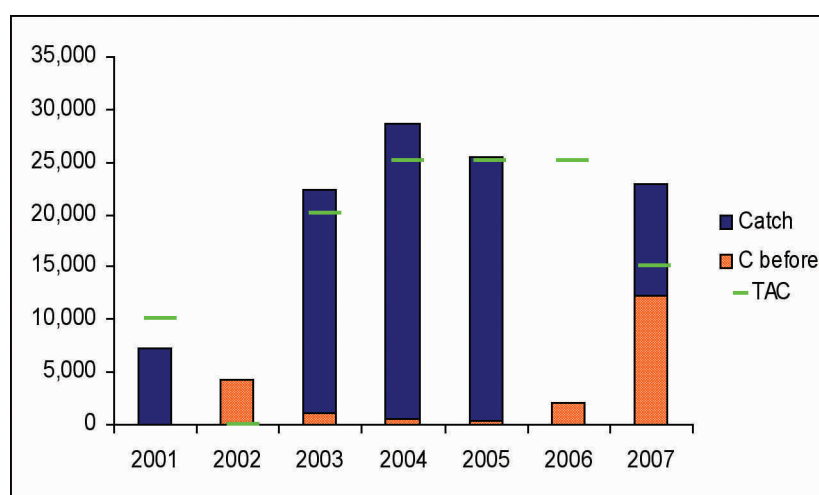


From a scientific perspective the state of the pilchard stock is in a precarious state. The three surveys conducted varied in biomass estimates from 0 to 61 000 tons, far below the envisaged minimum of 500 000 tons spawning stock biomass. Most fish appears

to be from the 2005/6 cohort which did not have a chance to spawn yet. Recruitment for the last three seasons has been below average. The surveys low biomass estimates were verified by the stock assessment model's estimate of 35 000- 55 000 tons at the beginning of 2007.

More than half of the total catch of 2007 was caught as by-catch or "undirected" catch before the TAC of 15 000 tons was set by the end of June. This by-catch of 12 300 tons is the highest in recent years (see Fig. 9).

Most catches were made further north of Namibia's coast at the beginning of the year and then increasingly closer to Walvis Bay. Except for a few sets, most fish was caught close inshore. The length-frequencies of the catches showed that there is currently only one fishable cohort in the stock, and this cohort is still very young. This was confirmed by the survey results.



**Figure 9: Pilchard catch and TACs (green bar) in tonnes for the last few years, showing the amount caught as by-catch before the TAC was issued (orange) and the pilchard directed catch (blue).**

### 2.3.10 Cape Fur Seal



During the 2007 harvesting season the seal industry managed to fill 36.5% and 91.6% of the allocated 85 000 pup and 6 000 bull TAC, respectively. The latest pup count estimate (December 2006) amounted to 102 701. The total pup count for all harvested colonies (Cape Cross, Atlas – and Wolf Bay) was 69% less than the 1993 level. The 2007 pup count of Cape Frio, which is one of the fast increasing colonies, was 19.6% less than the year before.

The overall decrease in pup numbers observed during 2007 could have been a result of adult female seals that faced a scarcity of food during the latter half of 2006. Furthermore, the model estimated a pup number of 230 000 born during December 2007 and a total population size of around 620 000 (1+) foraging individuals in January 2008.

The total consumption by seals in 2007 was estimated at slightly less than 860 thousand tons. The proportion of non-commercial species in the biomass consumed was 67.1%, the highest value of the past 15 years (45.4% in 2005 and 43.9% in 2006). These changes in diet composition resulted in a large decrease of consumption of commercial species from 537.7 thousand tons in 2005 to 282.9 thousand tons in 2007. On the other hand, the overall consumption of non-commercial species has increased by 72.3% mainly due to a large increase in goby consumption in the last 2 years.

### 3. MONITORING, CONTROL AND SURVEILLANCE (MCS)

#### 3.1 SEA SURVEILLANCE

During the review period 2007, the Ministry deployed two fisheries patrol vessels namely; PV Nathaniel Maxuili and PV Anna Kakurukaze Mungunda to enforce the sea surveillance functions in the country's Exclusive Economic Zone (EEZ), 200 (NM) nautical miles. PV Nathaniel Maxuili had 64 days at sea during which 54 sea inspections were carried on fishing vessels. The vessel sailed for 81 days in 2007, compared to 103 days in 2006. PV "Anna Kakurukaze Mungunda " spent 118 days at sea in 2007

**Table 6 : Deployment of fisheries patrol vessels during 2007**

Patrol Vessel	Day at sea	Distance	Number of inspection
<i>Nathaniel Maxuili</i>	81 days 11hrs	10 917nm	54
<i>Anna Kakurukaze Mungunda</i>	118 days 15hrs	15 377 nm	84
<b>Total</b>	<b>200 days 01 hr</b>	<b>26 294 nm</b>	<b>138</b>

Source: MFMR, 2007

#### 3.2 RESULTS OF SEA SURVEILLANCE

Altogether, the two fisheries undertook 16 missions. PV "Nathanael Maxuili" undertook five missions during which 56 observations on fishing vessels were made. On her part, PV "Anna Kakurukaze Mungunda" undertook 11 missions with fisheries inspectors onboard doing 78 observations.

**Table 7: Results of sea surveillance during 2007**

No Mission	of	Summons issued	Amount Paid	Outstanding Cases		
16		39	N\$2 700	26	11	14

Source: MFMR, 2007

#### 3.3 AERIAL SURVEILLANCE

The fisheries patrol fixed wing plane "Sea Eagle" undertook 36 patrol missions, totalling 115.1 flying hours. Compared to 315.16 in 2006. The downward trend in flying hours was caused by the non-availability of the aircraft in the last quarter "part of the year 2007. During the period under review 2007, 249 fishing vessels observations were covered during flights. In all, the "Sea Eagle" fixed wing patrol aircraft covered 19'831 nautical miles.

### 3.4 Coastal Patrol and Inland Inspections

The Walvis Bay MCS office undertook 1617 coastal patrols missions covering a distance of about 432 026 km. A total of 36 roadblocks were jointly attended with the Namibian Police (NamPol) Immigration and Traffic Officers during the year 2007.

A total of 1 399 summonses were issued. An amount of N\$190 150.00 was paid on summonses for a total number of 890 summons. Nineteen summons were withdrawn while 490, with a total value of N\$122 700.00, are outstanding.

A total of nine case dockets were opened with the police, of which seven case docket were finalised, while two were outstanding.

The Walvis Bay Fisheries Observer Agency Office has reported to the Walvis Bay MCS Office 52 cases of non-compliance. The Inspectorate investigated the reported cases, which ended up in 41 summonses being issued and N\$ 12 300.00 being paid. Some four warnings were issued, five cases withdrawn while twenty were still outstanding at the end of the reporting period.

**Table 8: Total violations reported by the Fisheries Observer Agency, and the results on follow-ups by the Luderitz MCS Office.**

Observers reports	Numbers of Report	Amount paid N\$
Threatening of Fisheries Observer	1	N\$300.00
Failing to complete logbooks	2	N\$600.00
Not carry official documents onboard	1	N\$300.00
Not adhering to quota conditions	1	N\$300.00
Discarding of Marine Resources	1	N\$300.00
Leaving without a fisheries Observe onboard	2	N\$600.00
<b>Total</b>	<b>8</b>	<b>N\$2400.00</b>

Source: MFMR, 2007

### 3.5 Luderitz MCS

A total of 541 coastal patrol missions were undertaken from Luderitz. Areas covered include Agate beach, Diaz point, Halifax, island, Angra point, Grossebuchk, Hottentots bay and Boggenfels covered a distance of 26345 km. A total of 8 roadblocks were jointly carried out with the Namibian Police, Immigration Officers and Traffic Officers during the Easter and December/January festive seasons. This office also participated in air and sea patrol operations.

### 3.6 Factories and harbour monitoring

**Table 9 : The level of compliance at factories and harbour**

Section	Nature of Offence	Fine Issued	
Whitefish and Pelagic (Walvis Bay)	Obstruction of inspectors	1	N\$ 300.00
	Failure to give 24 hours notice before offloading	4	N\$ 900.00
Luderitz MCS Office	Retain undersized and rock lobster in berry	181	N\$ 54 300.00
<b>Total</b>		<b>186</b>	<b>N\$55 500.00</b>

Source: MFMR, 2007



### 3.7 Vessel clearance

**Table 10 : The Walvis Bay MCS Office cleared fishing vessels by fishery types as indicated in table below**

	Hake wet	Horse Mackerel	Sword / Shark Tuna	Small Pelagic	Monk & Sole	Hake long line	Total
35	49	18	23	16	11	24	187

Source: MFMR, 2007

**Table 11 : The Luderitz MCS Office cleared fishing vessels by fisheries types as indicates in table below**

Hake wet	Tuna	Hake long line	Rock- Lobster	Total
12	34	6	25	77

Source: MFMR, 2007

### 3.7 Seal Harvest

The Inspectorate monitored seal harvesting at Atlas Bay, Cape Cross, and Wolf Bay in line with the Marine Resources Act, 2000 (Act 27 of 2000) Section 32, sub-section (1) to (6) , Section 33, sub-section (1) to (6) and Section 34, subsection (1) to (7) and inline with the Regulation Relating to the Exploitation of Marine Resources Section 20, Sub-section (1), (2) and (3).. Namibian Seal Right Holders harvested 16 227 seals at Cape Cross of which 3 616 were bulls, 24 cows, and 12 587 pups. A total of 18 500 seals were harvested at Atlas and Wolf Bay colonies, respectively, made up of 1 877 bulls, 39 cows and 16 584 pups.

### 3.8 Vessel Monitoring System (VMS)

The year 2007 has witnessed the full implementation of the VMS in the Namibian fishing industry. As from April 2007, licensed fishing vessels, except rock lobster, linefish and ski-boats were fitted with functional Automatic Location Communicators (ALCs).

**Table 12 : Results of law enforcement at Luderitz**

Section	Nature of offence	Total fines issued	Total amount
<b>Coastal Patrol &amp; Roadblocks</b>	Insulting a Fisheries Inspector	2	N\$600.00
	Harvest Marine Resource without Recreational fishing permit	4	N\$1200.00
	Retain under size and Rock lobster in berry	4	N\$1200.00
	Harvesting more than 7 Rock-Lobster per day	6	N\$1800.00
	Harvesting for Rock-Lobster after Sunset	2	N\$600.00
<b>Total</b>		<b>18</b>	<b>N\$5400.00</b>

Source: MFMR, 2007



### 3.9.1 Inland Fishery

The MCS Division undertook 519 missions along the rivers and inland water bodies in Caprivi, Kavango, Hardap, Karas, Ohangwena, Omusati, Oshana and Oshikoto regions. In the process, some 109 fines were issued while N\$8 250 was paid for non-compliance with Inland Fisheries legislation. Oshakati MCS Office confiscated 74 different type of nets, and Rundu and Katima Mulilo Offices 56 gillnets and 124 mosquito nets respectively.

**Oshakati** MCS Office undertook 78 missions covering a total distance of 17 425 km. Areas covered include Uuvudhiya, Olushandja, Calueque/Oshakati Canal and Kunene River. The inland fishery inspectors confiscated 74 fishing nets in these areas while non-law a binding fishers paid N\$1 800 for fines on summonses summons.

**Katima Mulilo** MCS Office undertook 253 missions, covering a distance of 30 542 km for terrestrial patrol and 3 540 km for aquatic surveillance. Six gillnets and mosquito nets were confiscated while non-law binding fishers paid N\$ 4,300.00 while an amount of N\$2,250.00 is outstanding.

**Rundu** MCS Office undertook 175 missions, covering a distance of 24 792 km on land and another 275 km on the Kavango River. Inland inspections were conducted from Mahango Game Park to Katwitwi border posts while aquatic patrols were undertaken along Kavango River. The Rundu Office confiscated 50 gillnets and 55 mosquito nets and issued 51 fines to which N\$ 15 150 was paid.

**Lüderitz** MCS Office undertook 15 inland fishery missions covering the Karas and Hardap regions. A total of 13 summonses to a value of N\$1 800.00 were issued to fishers found harvesting fish with gillnets in Karas and Hardap Regions.



Figure 10 : (L to R) Chief Control Fisheries Inspector Peter Schivute flanked by Senior Inspector Richard Uapingasana, standing on the banks of Naute Dam. On the right is dried fish that was caught in Naute Dam, Karas Region

**Coastal Patrol and Roadblocks:** A total of 541 coastal patrol missions were undertaken from Luderitz MCS Office. Areas covered includes Agate beach, Diaz point, Halifax, island, Angra point, Grossebuchk, Hottentots bay and Boggensfels covered a distance of 26 345 km. A total of eight roadblocks were jointly carried out with the Namibian Police (NamPol), Immigration Officers and Traffic Officers during the Easter and festive seasons. This office also participated in Air and sea patrol operations

## 4. THE ECONOMICS PERFORMANCE OF THE FISHING SECTOR

### 4.1 NUMBER AND DURATION OF FISHING RIGHTS

During 2007 the fishing industry and other related activities contributed to the economy in terms of production, employment, foreign exchange earnings and government revenue as indicated below. The total number of existing rights in 2007 was 155 Table 16 shows the number and duration of existing harvesting rights for each species.

**Table 13 : Number and duration of existing harvesting rights as at December 2007**

Fishery	Duration of Rights				Total
	Seven-year	Ten-year	Fifteen-year	Twenty-year	
Hake	1	13	24	0	38
Monk	0	2	5	0	9
Horse Mackerel	0	7	5	0	12
Large Pelagic	0	3	16	0	19
Red Crab	0	2	1	0	3
Rock Lobster	0	1	20	0	21
Line Fish	1	2	8	0	11
Orange Roughy	0	3	0	0	3
Pilchard	2	8	12	0	22
Mulletts	0	0	13	0	13
Seals	0	1	2	0	3
Guano	0	0	1	0	1
<b>Total</b>	<b>4</b>	<b>44</b>	<b>107</b>	<b>0</b>	<b>155</b>

Source: MFMR, 2007

Note: Currently no company qualified for twenty years term fisheries rights. Evaluation of all seven and ten year rights that is due to expire in 2007 and early 2008 was undertaken during 2005. Successful applicants were informed during 2006. During 2007 only three (3) fishing rights had automatically expired.

### 4.2 VESSEL LICENCES

The number of licensed vessels operating in Namibian waters from 2003 to 2007 is indicated in Table 17 .A total of 277 vessels were licensed for commercial fishing in the Namibian EEZ during 2007.

**Table 14 : Number of licensed vessels by fishery, 2003 – 2007**

<b>Fishery</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
<b>Small pelagic</b>	20	16	17	16	9
<b>Demersal Trawlers</b>	100	125	121	78	87
<b>Longliners</b>	8	17	28	39	30
<b>Midwater</b>	26	24	15	10	13
<b>Deepwater</b>	5	5	4	4	2
<b>Large pelagic</b>	49	73	52	65	67
<b>Linefish</b>	19	16	16	15	15
<b>Crab</b>	3	2	2	2	2
<b>Rock lobster</b>	42	34	28	18	32
<b>Monk</b>	21	22	25	22	20
<b>Total</b>	<b>279</b>	<b>334</b>	<b>308</b>	<b>269</b>	<b>277</b>

Source: MFMR, 2007

### 4.3 TOTAL ALLOWABLE CATCHES

The setting of Total Allowable Catches is one of the main management measures to prevent overexploitation of Namibian fish stocks. TACs are set for most commercial species in Namibia. Table 18 shows the TACs set by fishery during 2003 - 2007.

**Table 15 : Total Allowable Catches, 2003-2007 in tonnes.**

<b>Year</b>	<b>Pilchard</b>	<b>Hake</b>	<b>Horse Mackerel</b>	<b>Red Crab</b>	<b>Rock Lobster</b>	<b>Orange Roughy</b>	<b>Monk</b>
2003	20 000	180 000	350 000	2 000	400	2 650	12 500
2004	25 000	195 000	350 000	2 200	420	2 600	12 000
2005	25 000	180 000	350 000	2 300	420	2 050	11 500
2006	25 000	130 000	360 000	2 400	420	1 100	9 500
2007	15 000	130 000	360 000	2 500	350	900	9 500

Source: MFMR, 2007

### 4.4 LANDINGS

The total volume of marine resources production for 2007 was recorded at 412,671 metric tonnes. The production level represents approximately 18% decrease from the 504,300.28 metric tonnes landed during the previous corresponding period. The decrease is particularly due to decreased landings for demersal, deepwater and mid-water catches; however there was a moderate increase recorded within the small pelagic fisheries. The decline in total marine resource production was due to the decrease in Catch per Unit Effort (CPUE) and the one-month closure of hake fisheries during the month of October for conservation of juvenile fish, necessitated to conserve the biomass of this species to be at maximum sustainable yield levels. Mid-water trawl catches decreased from 267 994 metric tonnes to 175 971 metric tonnes during 2007 due to compliance with the marine resource regulations measures. Table 19 shows the marine resources production in (MT) and number of seals harvested for 2007. It is worth noting that the figures are provisional and might change over period of time.

**Table 16 : Landings of Commercial Species: 2003-2007**

<b>Species</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
Pilchard	22,255	28,605	25,128	2,314	23,522
Hake	189,588	189,305	173,902	135,771	129,542
Horse Mackerel	360,447	310,405	327,700	309,980	198,694
Monk	13,135	8,961	10,466	9,816	8,656
Kingklip	6,603	7,067	5,567	4,193	3,928
Tuna	3,371	3,581	3,654	2,903	6,818
Crab	2,092	2,400	2,408	2,228	2,854
Rock Lobster	269	214	248	285	117
Orange Rough	0	0	0	0	295
Other fish species	33,644	31,997	18,834	36,891	33,665
<b>Total Catch (MT)</b>	<b>631,121</b>	<b>567,133</b>	<b>552,164</b>	<b>504,382</b>	<b>412,671</b>
Seals (number)	34,000	59,407	64 167	83,045	34,728

Source: MFMR, 2007

#### 4.5 CATCH VALUE

The value of fish and fish products serves as an indicator of the performance of the fishing sector. Table 20 shows the three different value indicators for fish and fish products from 2002 to 2007. The first indicator is the landed value of the catch. This is the value of the fish in the form it is landed (i.e. ex vessel prices). Landed value increased by 14.2% between the years 2006 and 2007. During 2006 the landed value of fish was N\$ 3,146 million, which increased to N\$ 3,593 million during 2007. This improvement in landed value can be attributed to various factors, which include; an improvement in landings during 2007 and an increase in prices and better fish sizes as compared to 2006.

Final value, the second indicator, is the value of fishery products in their final form at export (ex factory) price. Final value is higher than landed value as it is shown in Table 20 below. This difference is attributed to value addition by onshore fish processing. The improvement in prices and fish sizes between 2006 and 2007 is most noticeable when looking at the significant increase in the final value of fish and fish products. During 2006, final value was N\$ 3, 985 million, which increased to N\$4843.75 million in 2007. This represents an increase of 15%.

The final indicator is the export value, which gives the Namibian dollar equivalence of foreign currency earnings brought into Namibia due to the sale of fish and fishery products. Over the years, Namibia's fishing industry has experienced remarkable growth and has become the country's second biggest export earner of foreign currency. However, export value drastically decreased between 2005 and 2006. This decrease was due to the reduced landings combined with currency and price fluctuations observed during 2006. Export increased significantly by 21% between 2006 and 2007 from N\$3883 million to N\$4711million respectively. The increase was, due to good prices fetched by Namibian products in the international markets and the favourable exchange rate during 2007.

During the year 2007, there was a significant improvement in landings, prices and sizes of many of Namibia's main export species. Should this trend continue, the fishing sector can expect positive financial returns, thus, improving the landed final and export values for the sector. The improvement in the resource stocks will in addition boost the increase in exports and thus financial returns.

**Table 17: Value of Fish and Fish Products - 2003-2007 (N\$ billions)**

	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
Landed Value	2,862	2,531	3,130	3,146	3,593
Final Value	3,867	3,427	3,789	3,985	4,843
Export Value	3,781	3,350	3,697	3,882	4,711
<b>% of Total export of goods</b>	<b>27.6</b>	<b>24.3</b>	<b>22.9</b>	<b>18.9</b>	<b>18</b>

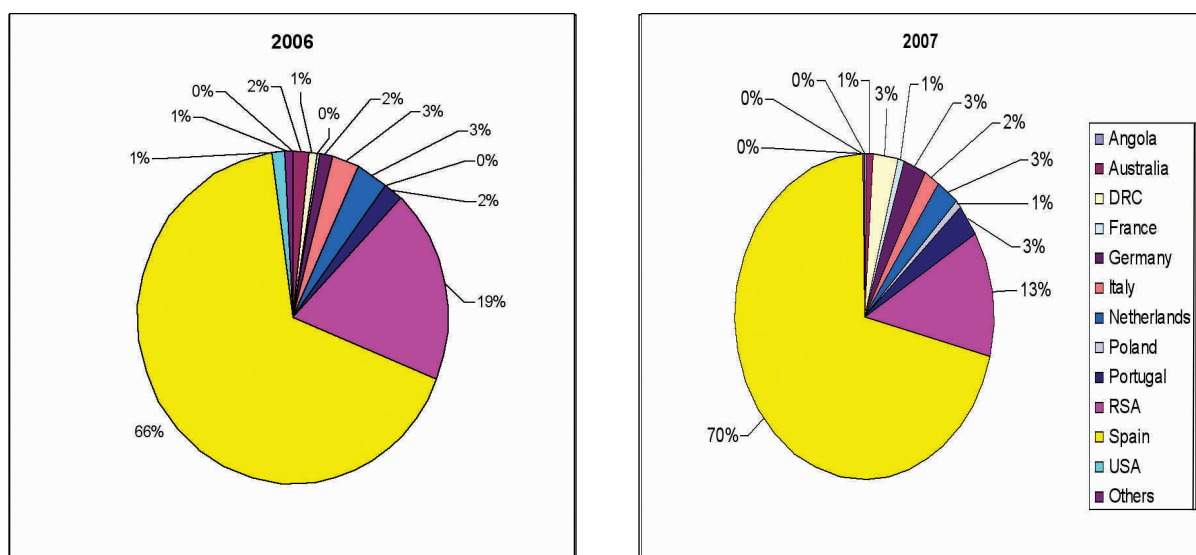
Source: MFMR & NPC, 2008

## **4.6 EXPORT MARKETS**

There are nine commercial species in Namibia. Of which more than 90% of Namibia's fish and fish products are exported in various forms to international markets in the European Union (EU), the United States of America (USA), the Far East as well as African markets.

Hake is the most valuable commercial specie in Namibia. The bulk of hake products are exported to the traditional European markets, such as; Spain, where it either enters the Spanish market or is distributed further to other markets like Italy, Portugal, France, Germany and Holland. Other non-European markets for Namibian hake are South Africa (SA), Australia, Malaysia and USA. Namibian hake products face major competition from SA, Europe, Argentina, Chile and Australia. Namibia has maintained its position as the leading frozen hake suppliers in, both, volume and value terms to the Spanish market, despite a volume drop due to the reduced TAC (*O'Sullivan. G, 2006*).

Figures 11 below show the export markets of Namibian hake products. The largest percentage of Namibian hake exports go to Spain making up 66% in 2006 and 70% in 2007 respectively. SA is the second largest market of Namibian hake products, whereby 19% and 13% of hake products were exported, in the years 2006 and 2007, respectively. The export markets for Namibian hake products remained consistent between 2006 and 2007.



**Figure 11: Export of Namibian hake products, 2006 and 2007**

Hake is, mainly, exported in the form of frozen fillets (skin on and skinless); and in other various product forms such as headed and gutted; baby hake; cutlets; tails; minced; blocks; sausages; wings and roes. As one of the biggest exporters of hake to the EU, Namibia should be able to enforce increased bargaining power in terms of more favourable prices, which in return should result in additional earnings for Namibia.

The bulk of other commercial fisheries such as monk are also exported to the European markets like Spain, Italy, France, Germany, Netherlands and Portugal. Rock lobster and crab dominate the Asian markets, more specifically, Japan. Horse mackerel is largely exported to the Democratic Republic of Congo. Other horse mackerel markets are SA, Mozambique and other SADC countries. Pilchard in the form of canned product is exported to SA and UK, while fishmeal and fish oil are mainly exported to SA. Namibia's share of the UK Pilchard imports has however suffered recently as a result of volume decline. Orange Roughy is exported to the USA, whereas Tuna and other Large Pelagic are shipped to USA, Japan and Spain.

Most players in the fishing industry are actively involved in implementing effective marketing strategies and constantly engaging in product differentiation as part of value addition to be able to ensure constant positive economic returns for the industry.

The outlook for 2008 is good with forecasted improvement in landings and prices set to increase. This will continue the recovery of the Namibian fishing industry, which started towards the end of 2007.



#### 4.7 CONTRIBUTION TO GROSS DOMESTIC PRODUCT (GDP)

The fishing sector is a major contributor to the national economy. The fishery sector has positioned itself as one of the major contributors to GDP. Contribution to GDP is an indicator of the level of output within the sector. This is essentially the gross income earned, wages and salaries, gross profits and indirect revenues from fish production. It does not include the value of intermediary inputs and it is therefore much less than the value of production.

Table 18 below indicates the contribution of the fishing sector to GDP, both for harvesting and processing. In 2006, the sector contributed 5.5% to GDP at current prices, a 0.5% reduction from 6% contributed in 2005. The sector rebounded in 2007 increasing its contribution to GDP by 0.2%, totalling an overall of 5.7%. This increase was due to the improvements in both fishing and fish processing on board and processing on shore due to increased landings experienced during 2007.

**Table 18 : Fisheries contribution to GDP, 2003-2007, at current prices (N\$ Million)**

<b>GDP Contribution</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
Fishing and fish processing on board	1,757	1,545	1,916	1,932	2,202
Processing on shore	876	750	466	662	793
<b>Total</b>	<b>2,633</b>	<b>2,295</b>	<b>2,382</b>	<b>2,594</b>	<b>2,996</b>
% of GDP	7.8	6.3	6.0	5.5	5.7

Source: NPC, 2008

#### 4.8 REVENUE GENERATED

Despite the decrease of quota fees and fund levy as shown in table22 below, the sector recorded an overall increase from N\$ 92,037 in 2006 to N\$ 129,509 in 2007. The increase in quota fees is attributed to the collection of outstanding quota fees, mainly, in the hake fisheries. However, stern measures were put in place to collect and settle all outstanding fees owed by the fishing industry

**Table 19 : State Revenue - 2003-2007 (N\$ millions)**

<b>Fees</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
<b>Quota fees</b>	74,437	84, 629	81,363	68,299	107,218
<b>Marine Resources Fund levy</b>	12,042	17, 663	17, 358	12,446	12,561
<b>By-catch fees</b>	13,561	16, 294	7,699	11,199	9,639
<b>License fees</b>	187	110	111	93	91
<b>Total revenue</b>	<b>100,227</b>	<b>120,292</b>	<b>106,531</b>	<b>92,037</b>	<b>129,509</b>

Source: MFMR, 2007

During 2007, a total of N\$ 1 019 116.00 was generated from recreational fishing permits.

**Table 20 : Types of permit issued in 2007**

<b>Period</b>	<b>Total number of Permits</b>	<b>Amount Received (N\$)</b>
Monthly permits issued	54 026	N\$7 560 364.00
Yearly permits issued	1 564	N\$262 752.00
<b>Total</b>	<b>55 590</b>	<b>N\$1 019 116.00</b>

Source: MFMR, 2007

#### **4.9 THE MARINE AQUARIUM: VISITORS AND INCOME**

The number of visitors (individual and groups) that visited the Aquarium during 2006 is outlined in the table below.

**Table 21 : Income generated from the National Marine Aquarium in 2007**

<b>Groups of Visitors</b>	<b>Number of visitors</b>	<b>Revenue (N\$)</b>
Children	8 654	43 270
Foreign Children	1 020	15 300
Pensioners	1 119	5 595
Foreign Pensioners	615	9 225
Adults	1 1797	117 970
Foreign Adults	2 940	88 200
Individual Students	561	2 805
School Groups	5 138	5 111
Teachers	572	2 860
<b>Total</b>	<b>32 416</b>	<b>290 336</b>

Source: MFMR, 2007



## 5. THE AQUACULTURE SECTOR

### 5.1 AQUACULTURE PERFORMANCE

The Directorate of Aquaculture comprises two key sub sectors. The first is mariculture (or marine aquaculture), and the second is inland (or freshwater) aquaculture. Marine aquaculture focuses primarily on commercial culture of shellfish and experimental culture of finfish, molluscs and seaweed; whereas inland aquaculture is aimed at freshwater fish production to promote food security. Increased production in both marine and freshwater aquaculture was experienced during 2007 with an increased number of private individuals and international investors showing a great interest in the sector.

### 5.2 MARINE AQUACULTURE

Mariculture production comprises predominantly oysters (mainly *Crassostrea gigas*) farmed at Lüderitz, Walvis Bay and Swakopmund, with production of abalone (*Haliotis midae*) at Lüderitz. Pilot culture of rock lobster (*Jasus lalandi*) and mussels (*Mytilus galloprovincialis*) began in Lüderitz in 2007.



Figure 12: Oyster bags from a mariculture farm in Lüderitz (left) and shelled oysters (right)

### 5.3 MARICULTURE RESEARCH

The Division Research, Monitoring, Disease and Quality Control caters specifically for coastal mariculture and is situated at the National Marine Information & Research Centre (NatMIRC) in Swakopmund. The division aims to promote the rapidly expanding mariculture industry.

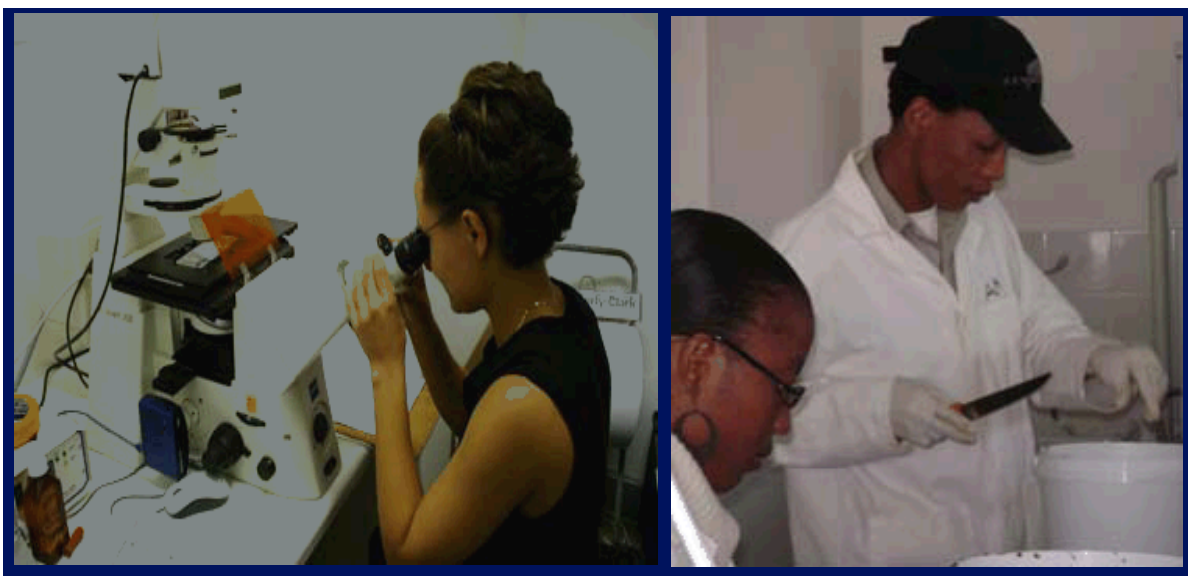


Figure 13: Abalone (left) and a land based abalone farm in Lüderitz (right)

The primary function of the Division is to continuously monitor sea water in the growing areas, as the sea water quality directly affects aquaculture products. Because present production comprises molluscan shellfish (oysters and abalone), all growing sites are monitored comprehensively according to the regulatory national Shellfish Sanitation Programme which has been designed to both EU and US-FDA standards. The programme

includes Harmful Algal Bloom (HAB) detection and testing for associated biotoxins, as well as microbial analysis and specialized chemical analysis.

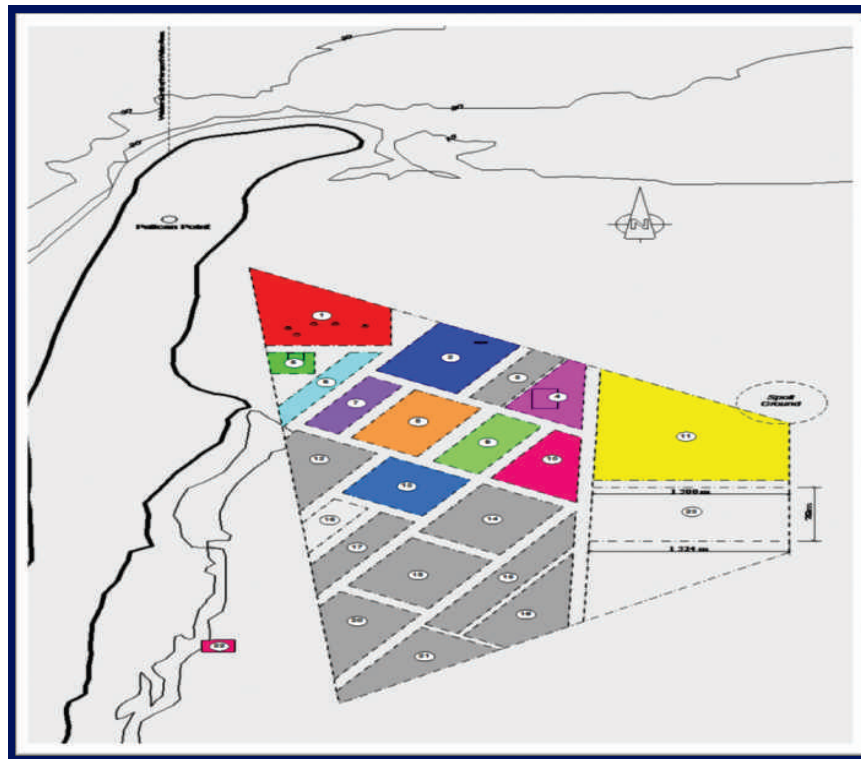
Sampling is facilitated by the Ministry's skiboat "*Noctiluca*" and three of the aquaculture staff trained as skippers in 2007 have become proficient in handling the boat. Testing of collected samples is carried out according to international requirements and norms, which are required for export of Namibian shellfish. In 2007 the first consignment of frozen oysters was shipped to Singapore, following acceptance of the Namibian Shellfish Sanitation Programme by Singapore authorities. First steps were taken in 2007 to work towards access to the US-FDA market.



In addition to regulatory monitoring, the natural coastal environment is monitored by aquaculture staff. Results from the monitoring inform both scientists and mariculture farmers of natural changes in the sea that affect the growth and condition of the shellfish. Parameters that are measured include temperature, oxygen, phytoplankton and hydrogen sulphide. Samples are analysed immediately and results are made available to the farmers.

For the most part of 2007, environmental conditions were excellent with no incidence of regulatory HAB toxins or hydrogen sulphide, except in December when one farm was temporarily closed due to the presence of the HAB biotoxin DSP.

Dedicated aquaculture areas, both in the sea and on coastal land, are necessary for development of the mariculture sector.



**Figure 15: A view of sea based aquapark 1 in Walvis Bay**

All plots in Aquapark 1 in Walvis Bay have been allocated to licensed shellfish companies, with companies awaiting occupation of Aquapark 2 (in Walvis Bay, off Bird Island) which will become available once environmental clearance has been satisfied through the Ministry of Environment and Tourism. With an increased understanding of the sector, the lengthy procedures required to procure coastal land for mariculture progressed considerably in 2007 in comparison to 2006, and finalization of onshore mariculture zones is expected in 2008. These zones are a prerequisite for intensive systems for abalone, finfish and poly-culture systems.

Ongoing efforts to address the lack in availability of accredited in-country laboratories are nearing fruition as the newly-established Namibian Standards Institute has prioritized biotoxin laboratories for Walvis Bay. The laboratories will be fitted out in 2008.



The Ministry's mariculture initiatives continue to receive excellent co-operation from the current licence holders, the regional councils and municipalities of the coastal towns, as well as from Namibia Ports Authority (Namport). Good working relationships with these entities allow for efficient and continuous growth of this industry.

#### **5.4 FRESH WATER AQUACULTURE**

Namibia's growing demand for freshwater cultured fish has accelerated the growth in the freshwater aquaculture industry. As such, the aquaculture sector has made significant advances in increased fish production, economic development and food security.

##### **5.4.1 ONAVIVI / OMAHENENE INLAND AQUACULTURE CENTRE, OMUSATI REGION**

The '*Aquaculture in Northern Namibia*' (ANN) project was signed during March 2007. The project is a Spanish/Namibian cooperation project and has three key activities. First is construction of the first fish feed plant at the Omahenene/Onavivi Inland Aquaculture Center in the Omusati Region. Second is the expansion of breeding ponds and construction of cages for both brood stock control and rearing of fingerlings. Third was the strengthening of extension services to local farmers.



**Figure 15: Cage construction for broodstock and fingerling rearing through the Spanish supported ANN Project at Omahenene/Onavivi**

### 5.4.2 OSHAKATI EXTENSION OFFICE, OSHANA REGION

The Oshakati extension office provides technical support and extension services to fish farmers in 6 regions (Table 25). Fingerling distribution is a key function of this office where the fingerlings are produced at the Omahenene/Onavivi Inland Aquaculture Centre, and the extension officers distribute the fingerlings to identified fish farmers in six regions.

### 5.4.3 SITE IDENTIFICATION, VISITS AND ASSESSMENT

**Table 22 : Number of identified fish farmers in 2007 per region**

Region	Number of Fish Farmers
Kunene	5
Ohangwena	16
Omusati	27
Oshana	7
Oshikoto	11
Otjozondjupa	1
<b>TOTAL</b>	<b>67</b>

Source: MFMR, 2007

**Table 23 : Number of Fish Farmers given fingerlings in 2007 per region**

Region	No of Fish Farmers	Tilapia fingerlings	Catfish fingerlings
Kunene	0	0	0
Ohangwena	16	43962	3992
Omusati	22	20547	2380
Oshana	8	3355	732
Oshikoto	2	11330	0
Otjozondjupa	1	1100	0
<b>TOTAL</b>	<b>49</b>	<b>80 294</b>	<b>7 104</b>

Source: MFMR, 2007



**Figure 16: Extension Officers transporting fingerlings (left) and weighing fingerlings for stocking (right)**

### 5.4.4 FISH FARM FOLLOW UP VISITS

Follow up visits to fish farmers who have been provided with fingerlings is a vital function of extension services. These visits provide fish farmers with information on how to take care of the baby fish up to market size. Extension officers also assist fish farmers in harvesting their crop once it is ready, and facilitate access to markets when the fish produced exceeds what the farmers can consume, or store.

**Table 24 : Number of fish farms monitored during 2007 per region**

Region	NO of Fish Farmers
Kunene	0
Ohangwena	23
Omusati	63
Oshana	16
Oshikoto	43
Otjozondjupa	2
<b>TOTAL</b>	<b>147</b>

Source: MFMR, 2007

**Table 25 : Number of Fish Farms harvested in 2007 per region**

Region	No of Fish Farmers	Total No. of fish harvested		Total weight (kg) harvested	
		Tilapia	Catfish	Tilapia	
Kunene	0	0	0	0	0
Ohangwena	11	6 722	66	468	12.380
Omusati	19	1 1516	21	3 156	1.474
Oshana	8	3 361	4	111	0.37
Oshikoto	6	11 782	0	1443	0
Otjozondjupa	0	0	0	0	0
<b>TOTAL</b>	<b>44</b>	<b>33 381</b>	<b>91</b>	<b>5178.00</b>	<b>14.224</b>

Source: MFMR, 2007

#### 5.4.5 EPALELA FISH FARM, OMUSATI REGION

Epalela Fish Farm was completed in October 2007 and inaugurated on the 10th November 2007. The farm infrastructure includes twelve earthen ponds of 3700m each; nine concrete ponds for growing catfish, a fish processing facility and an office block. The farm's main function is to ensure that fresh fish is produced all year round.



**Figure 17: Preparation before the Epalela Fish Farm inauguration ceremony, 10 November 2007 (left) are guests in attendance at Epalela Fish Farm on 10 November 2007.**

#### 5.4.6 RUNDU REGIONAL OFFICE

The aquaculture extension office in Rundu carries out three primary activities which include (a) provision of extension services to the three pilot scale community based fish farms in the Kavango Region (b) to provide extension services to fish farmers in the Otjozondjupa Region and (c) to provide extension services to emerging subsistence fish farmers in the Kavango Region.



#### **5.4.7 KATIMA MULILO REGIONAL OFFICE**

The Aquaculture extension office in Katima Mulilo has three primary activities which include (a) carrying out extension services to the two pilot scale community based fish farms in the Caprivi Region (b) to carry out annual river research biological and monitoring surveys and (c) to provide extension services to emerging subsistence fish farmers in the Caprivi Region.

#### **5.4.8 KAMUTJONGA INLAND FISHERIES INSTITUTE**

Kamutjonga Inland Fisheries Institute (KIFI) has recently been established along the Kavango River close to Mahango Game Park in the Kavango Region. KIFI is a fishery and aquaculture research centre, and its mission is "To be a Regional Centre providing Leadership in Aquaculture Research, Fisheries Management and Capacity Buildings". The Institute has four primary objectives which are (1) Research, (2) Fish & Fingerling Production (3) Training and (4) a Data or Information Centre.



**Figure 18: Kamutjonga Inland Fisheries Institute situated along the Kavango River in the Kavango Region**

#### **5.4.9 OTJOZONDJUPA FISH FARMERS**

Fish Farming in the Otjozondjupa Region is characterized by subsistence livestock farmers who stock existing dams on their farms with fish. There are approximately 30 subsistence fish farmers in the Otjozondjupa Region to whom approximately 15 000 fingerlings were distributed during 2007. Extension services are provided to these farmers on an ongoing basis. Harvesting in that region amounted to 1 tonne of fish in total.

#### **5.4.10 SCHOOL BASED FISH PONDS**

Learner centred fish ponds have been established at participating school, where extension officers together with the natural science teachers establish a fish pond. Demonstrations on fingerling stocking, fish breeding and harvesting takes place at these learner-centred fish ponds. The Ministry wishes to encourage schools to participate in the school based fish farming programme.



**Figure 19: A Learner centred fish pond at Tsintsabis Secondary School in Otjozondjupa (left) and extension officers working in a private dam located on a livestock farm (right)**

## **6. HUMAN RESOURCE DEVELOPMENT**

The Ministry places much emphasis on the development of human resources in Namibia. This entails training of the Ministry's staff as well as training of fish farming communities for integration into the aquaculture mainstream.

### **6.1 BURSARIES**

During the year under review, six Engineer Officers are awarded bursaries to upgrade their qualification to Class II level in South Africa in order to comply with STCW'95 requirements. Another six Deck Officers are registered with NAMFI to also upgrade their qualification to Class II Management Certificate.

During the year under review, no bursaries were awarded for qualifying full time or part time studies. However thirteen (13) staff members from the previous years' bursary award are still studying of which four are expected to complete their degree and diploma studies by the end of this year. Besides those being funded by the Ministry, four staff members were granted Special leave with full remuneration in order to further their studies in the fields deemed relevant to the Ministry's activities through private funding.

### **6.2 NAMIBIAN MARITIME AND FISHERIES INSTITUTE (NAMFI)**

Namibian Maritime and Fisheries Institute (NAMFI) continue to play an important role in the training of Namibians for the fishing industry. The nine-months Fisheries Inspector and Observer Certificate (FIOC) Training Programme, for fisheries inspectors and observers, has significantly contributed to the improvement of knowledge and performance of fisheries inspectors and observers. In July, four (4) Fisheries Inspectors and twenty (21) Observers were registered for the FIOC programme and are expected to complete their training in April 2008.

### **6.3 SKILLS DEVELOPMENT TRAINING**

The Ministry does not only focus on professional training but it also makes provision for soft skills development to enhance the daily routine performance of the staff members. Eighty four (84) staff members were trained on soft skills during the year under review in the areas of Basic Safety, Discipline Management, Customer Care & Record Management, HACCP, Incident & accident report writing, Software Asset Management and Skippers etc.



## 7. INTERNATIONAL FISHERIES RELATIONS

### 7.1 SOUTH EAST ATLANTIC FISHERIES ORGANISATION (SEAFO)

Namibia took over the chairmanship of SEAFO as from 2007. Namibia assigned Mr Frans Tsheehama Permanent Secretary of the Ministry to chair the SEAFO session during the organisation's the 4<sup>th</sup> Annual Meeting, which took place on 8-9 October 2007.

SEAFO adopted three important conservation measures during the 2007 annual meeting. These are:

- (i) **Conservation Measure 08/06:** Related to the establishment of a list of vessels presumed to have carried out illegal, Unreported and Unregulated (IUU) activities in SEAFO Convention Area;
- (ii) **Conservation Measure 10/07:** Fixing catch limits and related conditions for the Patagonian Toothfish and Red Crabs fisheries in the SEAFO convection area in 2008 and 2009
- (iii) **Conservation Measure 11/07:** Laying down conditions for the resumption of fishing activities in areas increase subject to closure through conservation measure 06/06

### 7.2 INTERNATIONAL COMMISSION FOR THE CONSERVATION OF ATLANTIC TUNAS (ICCAT)

ICCAT is responsible for the conservation and management of tunas and tuna-like species in the Atlantic Ocean and adjacent seas.

In November 2007, Namibia attended the 20<sup>th</sup> Regular Meeting of ICCAT held in Antalya, Turkey. This meeting took place against a backdrop of major developments in the ICCAT family. Discussions have ranged around achievement of systematic balance in quota shares for countries and coastal states actively fishing for species under the review of ICCAT. This balance comes from those fishing nations to those still developing their fisheries. Limiting to this transfer was identified as lack of capacity by developing nations.

The second, important issues discussed were among others the management measures aimed at resource conservation and combat of IUU activities. Management measures were also highlighted as very important and have to be a prioritised as the responsibility of the flag states and Compliance Committee. Southern albacore is the most important tuna specie for Namibia and the end at the end of 2007.a roll over of the provisions of current measures was adopted until the next stock assessment has been completed. The sharing arrangement for swordfish has to go on until 2009 when each of the three years Namibia has been allocated a quota of 1400 tonnes. Namibia is allowed to catch up to 2100 tonnes of big eye tuna per year through a sharing arrangement. The issue of assistance to developing states from funds made available by developed ICCAT during the next schedule meeting.

### **7.3 INTERGOVERNMENTAL ORGANISATION FOR FISHERY INFORMATION AND CO-OPERATION SERVICES FOR FISHERY PRODUCTS IN AFRICA INFOPECHE)**

INFOSA (the unit of INFOPECHE in the SADC region) continued to assist the fisheries industry and the authorities of the region with marketing and technical information. In 2007, INFOSA organized various training courses in Mozambique, under an ICEIDA funded project, and in Seychelles, as part of the national training courses in quality assurance, traceability and eco labelling, dispensed by INFOSA in SADC member states. INFOSA also organised a national workshop on trends in the seafood industry in Swakopmund, Namibia, in December 2007.

Two studies on “Data Collection in the Small Scale Fisheries Sector in Zimbabwe and Zambia” were carried out and a study on “Improving the Competitiveness Position of Fish and Fishery Products from the SADC Region” was also completed and disseminated to all member states.

### **7.4 COMMISSION FOR THE CONSERVATION OF ANTARCTIC MARINE LIVING RESOURCES (CCAMLR)**

Namibia took over the chairmanship of CCAMLR for a period of two years, i.e. 2007 – 2008. The country assigned Peter Amutenya to chair the sessions of this important fishery organization for this period.

Namibia continued to benefit from the living marine resources found within the CCAMLR Convention area. For the 2006/7 fishing season, the country has licensed the fishing vessel “*Antillas Refeer*” to undertake research and exploration in the Antarctic. This vessel caught some 87 tons of *Dissostichus eleginoides* toothfish during this exercise.

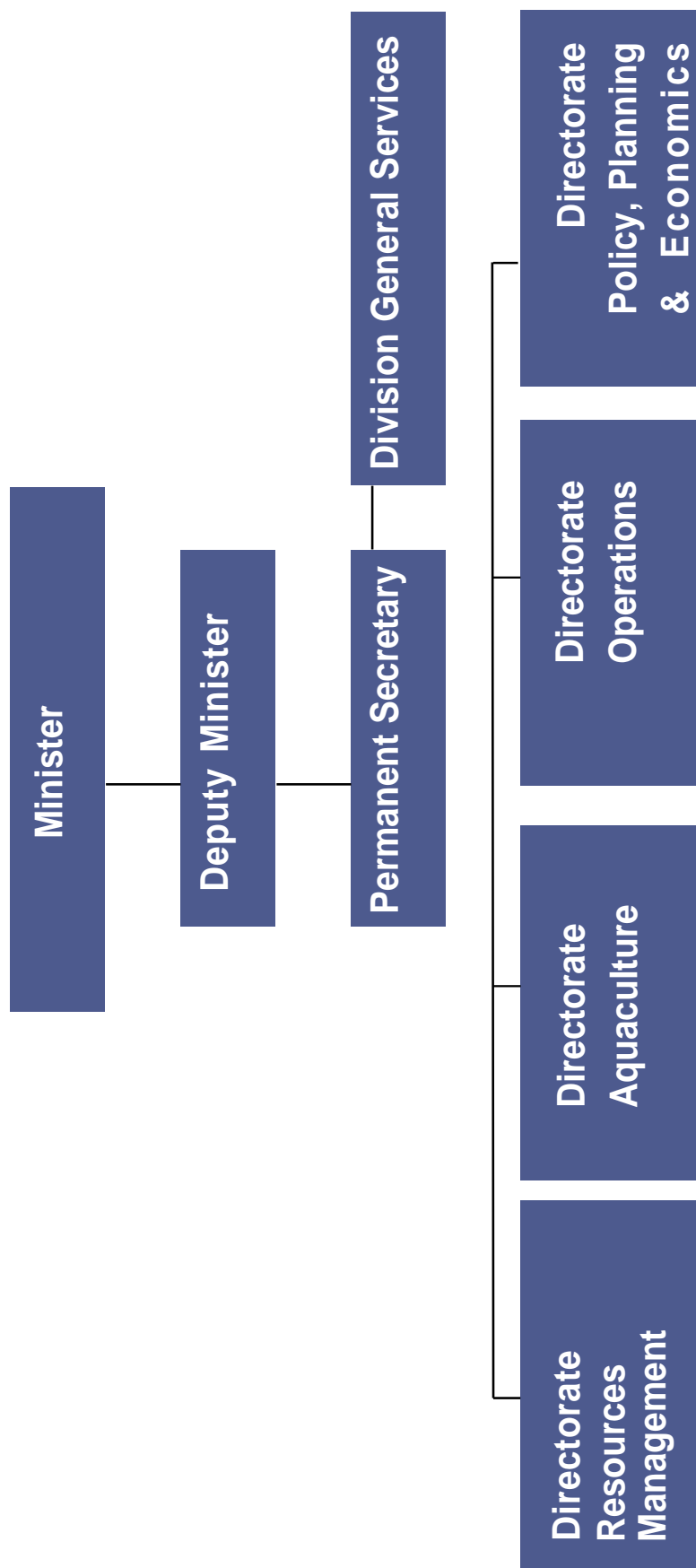
Namibia licensed two fishing vessels “Antillas Refeer” and “Paloma” during the 2007/8 fishing season. The performance of the two vessels will only be assessed at the end of the year as the season is still running up to October 2008.

## Annex1 : Useful contacts

Institution and contact details	Mandate
Ministry of Fisheries and Marine Resources (MFMR)	
Head Office, Private Bag 13355, Brendan Simbwaye Square, Block C, Corner of Uhland & Goethe Streets, Windhoek, Namibia.  Tel: +264 61 2053911 Fax: +264 61 224566 www.mfmr.gov.na	Office of the Minister, sectoral policy, planning and economics, fisheries administration, legislative controls, data collection and analysis.
National Marine Information and Research Centre, (NatMIRC), Strand Street, Box 912, Swakopmund.  Tel: +264 64 410 1000 Fax: +264 64 404 385	Applied fisheries and environmental research, physical, biological and chemical oceanography, stock surveys and stock assessment, advice to MFMR on TACs for commercial stocks and other management measures, regional programmes and research collaboration, aquaculture and inland fisheries research and development.
NatMIRC Research Centre, Luderitz.  Tel: +264 63 202 415 Fax: +264 63 202 495	Branch of the Swakopmund head office. Main research activities include seals, seaweed, rock lobster as well as regular commercial fish stock surveys and assessment work.
Hardap Freshwater Research Institute, Private Bag 2116, Mariental.  Tel: +264 63 240 361 Fax: +264 63 242 643  Inland Fisheries - Rundu Office Private Bag 2084, Rundu. Tel: +264 66 256 853. Fax: +264 256 867  Inland Fisheries – Katima Mulilo Office Private Bag 1004, Ngweze. Tel: +264 66 253 224. Fax: +264 66 253 226	Freshwater fish and invertebrate research, migrations of freshwater fishes using radio tagging, development of freshwater aquaculture techniques and assessment of candidate species.
Fisheries Inspectorate Office, Box 394, Luderitz.  Tel: +264 63 202 905 Fax: +264 63 203 337	Monitoring, control and surveillance of marine commercial and recreational fisheries.
Fisheries Inspectorate Office, PO Box 1594, Walvis Bay.	Monitoring, control and surveillance of marine commercial and recreational

<p>Tel: +264 64 201 6111 Fax: +264 64 205,008</p>	<p>fisheries.</p>
<p><b>Regional programmes</b></p>	
<p>INFOPECHE Unit, Kenya House, 4th Floor, Robert Mugabe Avenue – Windhoek – Namibia.</p> <p>Tel: +264 61 205 3112/3 Fax: +264 61 205 3041 E-mail: <a href="mailto:infosadc@mweb.com.na">infosadc@mweb.com.na</a> Web page: <a href="http://www.golbefish.org/entry_infopech.htm">www.golbefish.org/entry_infopech.htm</a></p>	<p>Provides timely information regarding prices and trends in the marketplace and stimulates greater intra-regional and international trade in fish products.</p>
<p><b>Other institutions</b></p>	
<p>Namibian Maritime and Fisheries Institute (NAMFI), PO Box 3228, Walvis Bay.</p> <p>Tel: +264 64 203 114 Fax: +264 64 203 112</p> <p>Poly Andima 081 129 1983</p>	<p>Main institute providing education and training for MFMR staff, including Fisheries Inspectors, Fisheries Observers, patrol boat personnel and fisheries scientists.</p>
<p>Fisheries Observer Agency, PO Box 2903, Walvis Bay.</p> <p>Tel +264 64 219 500 Fax: +264 64 219 547/8</p>	<p>Management and administration of the MFMR Fisheries Observer Programme. Office should be fully operational from March 2002.</p>
<p>Fishing industry associations:</p> <p>Pelagic Fishing Association Hake Association Midwater Trawling Association Monk and Sole Association Tuna and Hake Longlining Association Deepwater Fishing Sector</p>	<p>PO Box 2513, Walvis Bay, Namibia.</p> <p>Phone: +264 (0)64 20 9083. Fax: +264 (0)64 20 6158.</p> <p>E-mail: <a href="mailto:hardrud@iafrica.com.na">hardrud@iafrica.com.na</a></p>

**ANNEX 2: MINISTRY OF FISHERIES AND MARINE RESOURCES STRUCTURAL ORGANOGRAM.**





# **REPUBLIC OF NAMIBIA**



**MINISTRY OF FISHERIES AND MARINE RESOURCES**

**ANNUAL REPORT 2007**